

QST

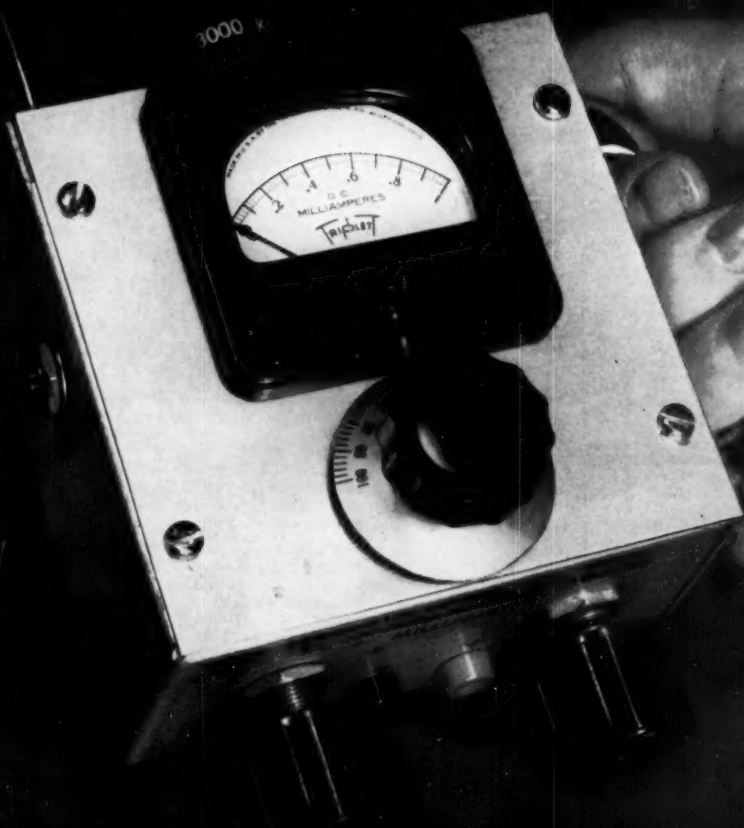
August 1955

50 Cents

55c in Canada

devoted entirely to

amateur radio



PUBLISHED BY THE AMERICAN RADIO RELAY LEAGUE

If you operate 'phone YOU WON'T BE SATISFIED UNTIL YOU OWN



the completely new

664 VARIABLE D* CARDIOID DYNAMIC MICROPHONE

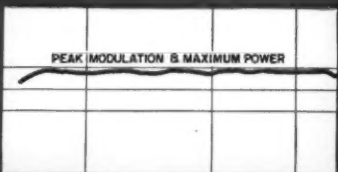
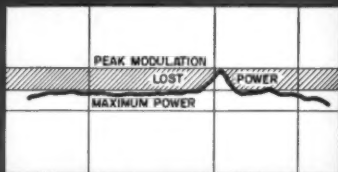
The 664 will equal a useful power increase of four times over commonly-used peaked microphones, and could well be the best investment, dollar-wise, in your shack

Here is a totally new concept in microphones for amateur phone communication.

The cardioid (high directivity at all frequencies) pickup pattern enables you to have a *real* "arm chair QSO." The forward gain of 5 db** allows you to speak at nearly twice the distance you have been working to a conventional microphone. Unwanted sounds in the shack are rejected nearly twice as effectively as by ordinarily-used non-directional microphones.

The response curve is tailored to put the highest degree of intelligibility on your carrier. Your 100% modulation is all speech . . . in full character . . . with bite and punch. This curve, compared to ordinary microphones, will give you up to 12 db more usable audio—without splatter or hash.

We invite you to prove to yourself that the 664 will outperform your present mike by a direct comparison. If it doesn't out-hurdle QRM, your distributor will refund the purchase price without qualification.



A peak in the response curve limits modulation to the peak value. A peak-free response brings the full power level to 100% modulation gaining an intelligibility increase equal to the peak in the average mike. The 664 is peak-free and gives the highest usable power of any microphone for AM, NFM and SSB.

New Variable D* Dynamic Microphone operates on the principle of multiple sound paths to the diaphragm. Spaced apertures to the rear of the diaphragm are phased to provide cancellation of rear sounds and give full response to sound from the front.

This new principle enables the curve to be free from peaks or dips. Insures freedom of blasting and boominess from close talking. Eliminates effect from mechanical shock. High level -55 db. Acoustalloy diaphragm. Switch easily changed to relay control, if desired. Absolutely unaffected by moisture, humidity, or temperature.

Model 664. Without Stand.....Net Price: \$47.70
Model 419. Desk Stand.....Net: 9.00

**Forward gain is that compared to a pressure mike; actual front-to-back hemisphere pick-up ratio is 20 db.

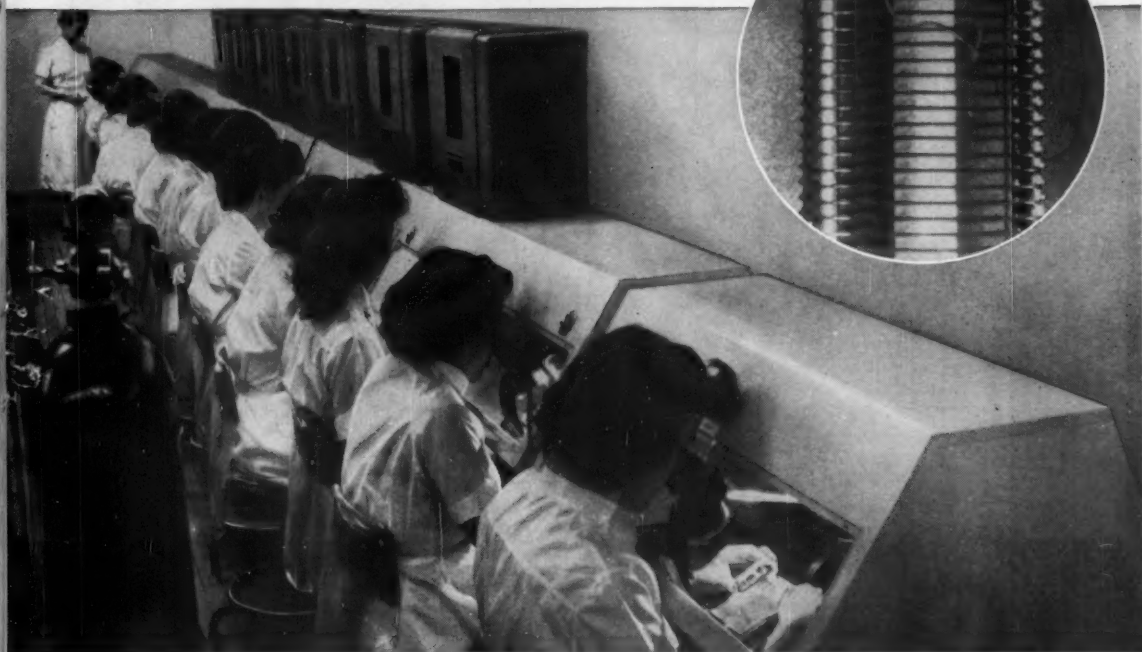
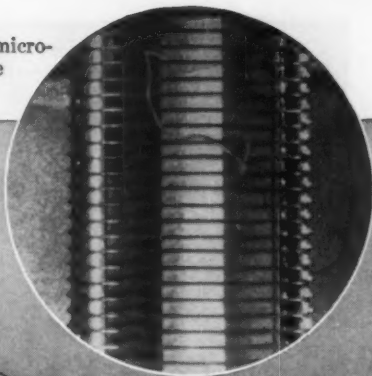
*Patent Pending

See your E-V Distributor,
or write for Specification Sheet

Electro-Voice®

ELECTRO-VOICE, INC. • BUCHANAN, MICH. • Export: 13 E. 40th St., N. Y. 16

• Right: the "why" of G-E "Operation Snow White". Unretouched micro-photograph of tube grid, shows a strand of lint which can easily cause an inter-electrode short-circuit. Dust particles have similar effect.



• Glass-paneled hoods for General Electric 5-Star Tube assembly and microscope inspection, assure working conditions of optimum cleanliness. Employees wear rubber finger cots,

to avoid contaminating tube parts with dirt or moisture. The entire "Snow White" area is air-conditioned and pressurized, and all garments are made of lint-free Nylon and Dacron.

G-E "Operation Snow White" further increases 5-Star Tube high reliability!

Inoperatives among 5-Star Tubes have been cut two-thirds by measures G.E. has taken to provide lint-free, dust-free assembly and inspection. 100% 5-Star factory tests prove this gain in *built-in* tube dependability.

Most tube inoperatives are the result of intermittent "shorts" from lint and dust. G-E "Operation Snow White", by means of pressurized, filtered, and dehumidified air, plus numerous other steps to accent working cleanliness, cuts down on short-circuits at the source. Result: 5-Star Tubes are the most trust-

worthy types that you can install!

Use them in civil-defense work, where dependable communications are a "must"! Specially designed, built, and tested, they're your foremost protection against rig and receiver failures.

Your G-E tube distributor stocks 5-Star high-reliability tubes. See him for full information! *Tube Department, General Electric Co., Schenectady 5, N. Y.*

Progress Is Our Most Important Product

GENERAL  ELECTRIC
100-184

The **MOBILE MANUAL**

FOR RADIO AMATEURS

\$2.50

**SELECTED
ARTICLES
ON
MOBILE**

- » **RECEIVERS**
- » **TRANSMITTERS**
- » **ANTENNAS**
- » **POWER
SUPPLIES**



JUST OUT!
352 Pages
400 Illustrations



PUBLISHED BY THE AMERICAN RADIO RELAY LEAGUE

QST

AUGUST 1955

VOLUME XXXIX • NUMBER 8

PUBLISHED, MONTHLY, AS ITS OFFICIAL ORGAN, BY THE AMERICAN RADIO RELAY LEAGUE, INC., WEST HARTFORD, CONN., U. S. A.; OFFICIAL ORGAN OF THE INTERNATIONAL AMATEUR RADIO UNION

STAFF

Editorial

A. L. BUDLONG, WIBUD
Editor

HAROLD M. McKEAN, WICEG
Managing Editor

GEORGE GRAMMER, WIDF
Technical Editor

DONALD H. MIX, WITS
BYRON GOODMAN, WIDX
Assistant Technical Editors

EDWARD P. TILTON, WIHDQ
V.H.F. Editor

C. VERNON CHAMBERS, WJEO
LEWIS G. MCCOY, WIICP
E. LAIRD CAMPBELL, WICUT
Technical Assistants

ROD NEWKIRK, W9BRD
DX Editor

ELEANOR WILSON, WIQON
YL Editor

ANN B. FURR, WIZIB
Production Assistant

WILLIAM A. PAUL, W1DXI
Editorial Assistant

Advertising

LORENTZ A. MORROW, W1VG
Advertising Manager

EDGAR D. COLLINS
Advertising Assistant

Circulation

DAVID H. HOUGHTON
Circulation Manager

J. A. MOSKEY, W1MY
Assistant Circulation Manager

OFFICES

38 La Salle Road

West Hartford 7, Connecticut

TEL.: AD 3-6268 TWX: HF 88

Subscription rate in United States and Possessions, \$4.00 per year, postpaid; \$4.25 in the Dominion of Canada, \$5.00 in all other countries. Single copies, 50 cents. Foreign remittances should be by international postal or express money order or bank draft negotiable in the U. S. and for an equivalent amount in U. S. funds.

Entered as second-class matter May 29, 1919, at the post office at Hartford, Connecticut, under the Act of March 3, 1879. Acceptance for mailing at special rate of postage provided for in section 1102, Act of October 3, 1917, authorized September 9, 1922. Additional entry at Concord, N. H., authorized February 21, 1929, under the Act of February 28, 1925.

Copyright 1955 by the American Radio Relay League, Inc. Title registered at U. S. Patent Office. International copyright secured. All rights reserved. Quedan reservados todos los derechos. Printed in U. S. A.

INDEXED BY
INDUSTRIAL ARTS INDEX

Library of Congress Catalog
Card No.: 21-9421

—CONTENTS—

TECHNICAL —

- An Improved Antenna Bridge
R. Wade Caywood, W1KRD 11
- The Transistorized "Little Gem"
E. Laird Campbell, W1CUT 16
- 807s in Parallel.....Francis M. Yancey, K4CDO 18
- Power and Meter Facts in S.S.B. Operation
Howard F. Wright, jr., W1PNB 21
- Portable Antennas for 50 and 144 Mc.
Edward P. Tilton, WIHDQ 29
- A Six-Meter Club Project John P. Drummond, W3YHI 37
- The Viking Adventurer.....(Recent Equipment) 39
- Models 650 and 651 Matchmasters
(Recent Equipment) 40
- What About the Low-Frequency Harmonics?
Charles L. Wood, W2VMX 42

BEGINNER —

- One Tube — 80 and 40 Meters — 75 Watts
Lewis G. McCoy, WIICP 26

MOBILE —

- The Automobile Storage Battery and Its Charging
System.....Donald H. Mix, WITS 32
- Revision of 6-Volt Equipment for 12-Volt Operation.... 36

OPERATING —

- The Buffalo Area RACES Organization
C. E. Johnson, jr., W2PPY 44

GENERAL —

- ARRL at Operation Cue.....George Hart, W1NJM 45
- QST — Volume IV.....Sumner B. Young, W0CO 48

- | | | | |
|---------------------------------------|----|------------------------------|-----|
| "It Seems to Us" | 9 | Correspondence from Members. | 51 |
| Our Cover..... | 10 | YL News and Views..... | 52 |
| ARRL Roanoke Division Convention..... | 10 | Hints & Kinks..... | 54 |
| Coming ARRL Conventions.... | 10 | The World Above 80 Mc..... | 55 |
| In QST 25 Years Ago..... | 35 | How's DX?..... | 59 |
| New Books..... | 35 | Operating News..... | 64 |
| Silent Keys..... | 38 | With the AREC..... | 66 |
| ARRL QSL Bureau..... | 41 | Station Activities..... | 71 |
| Happenings of the Month..... | 50 | Feed-back..... | 128 |
| | | Hamfest Calendar..... | 134 |

why is the SX-96 the most wanted receiver on the air?

The Hallicrafters double conversion selectable side band receiver offers major improvements in stability by the addition of temperature compensation in the high frequency oscillator circuits and the use of crystal controlled second conversion oscillators. Hallicrafters highly selective 50 kc i-f system is used in this new precision-built receiver.

Coverage: Standard Broadcast, 538-1580 kc; Three S/W Bands, 1720 kc-34 Mc, Band 1: 538 kc-1580 kc-Band 2: 1720 kc-4.9 Mc-Band 3: 4.6 mc-13 mc-Band 4: 12 mc-34 mc.

Type of Circuit: Double conversion superheterodyne over the entire frequency range.

Type of Signals: AM-CW-SSB.

Features: Precision gear drives are used on both main tuning and band spread dials. Double conversion with selectable crystal controlled second oscillators. Selectable side band reception of both suppressed carrier and full carrier transmissions by front panel switch, delayed AVC, CW operation with AVC on or off. Calibrated bandspread, "S" meter, low drift, double conversion superhet.

Controls: Sensitivity, band selector, volume, tuning, AVC on/off, noise limiter on/off, AM/CW-SSB, Bandspread, selectivity, pitch control, response (pwr on/off, LSB, USB-2 tone pos.), receive-standby.

Intermediate Frequencies: 1650 kc and 50 kc.

Tuning Assembly and Dial Drive Mechanism: Separate 3 section tuning capacitor assemblies for main tuning and bandspread tuning. Circular main tuning dial has 0-100 logging scale. Bandspread dial is calibrated for the 80, 40, 20, 15, and 11-10 meter amateur bands.

Selectivity: Five steps of bandwidth calibration at 6 db points; 5 kc, 3 kc, 2 kc, 1 kc, and .5 kc.

Antenna Input Impedance: Balanced/unbalanced.

Headphone Output Impedance: Nominal 500 ohms.

Audio Output Impedance: 3.2/500 ohms.

Automatic Noise Limiter: Series noise limiter operated by toggle switch on front panel.

Carrier Level Indicator: Calibrated in "S" units from 1 to 9, decibels to 90 db over S9, microvolts from 1 to 1000 k.

External Connections: 3.2/500 ohm speaker terminals, terminals for single wire or double antenna, phono jack, AC power cord, socket for DC operation and remote control, audio output terminals, "S" meter electrical adjustment and mounting hole for co-axial cable connector. Phones jack on front panel.

Audio Power Output: 1.5 watts with 10% or less distortion.

Power Supply: 105/125 V, 50/60 cycle AC.

Model SX-96-\$249.95

Matching R-46B Speaker-\$17.95

hallicrafters

4401 West Fifth Avenue
Chicago 24, Illinois





**CRYSTAL
CONTROLLED
BUT NOT
"ROCK BOUND"**

Skip around as your heart desires . . . be a bandhopper with a vengeance . . . and yet retain the priceless advantages of crystal control. All you need is a half-dozen or more PRs. Multiple crystal operation is the answer to today's maddening QRM problems on phone or CW. It's most economical, too. See your jobber and select low-cost PRs from his all-frequencies stock. Be a gypsy on the band.

20 METERS, Type Z-3, \$3.95 • 40, 80 AND 160 METERS, Type Z-2, \$2.95

PR Crystals



USE **PR** AND KNOW WHERE YOU ARE

PETERSEN RADIO COMPANY, INC.
2800 W. BROADWAY • COUNCIL BLUFFS, IOWA

EXPORT SALES: Royal National Company, Inc., 8 W. 40th Street, New York 18, N. Y.

Section Communications Managers of the ARRL Communications Department

Reports Invited. All amateurs, especially League members, are invited to report station activities on the first of each month (for preceding month) direct to the SCM, the administrative ARRL official elected by members in each Section. Radio club reports are also desired by SCMs for inclusion in QST. **ARRL Field Organization station appointments** are available in the areas shown to qualified League members. These include ORS, OES, OPS, OO and OBS. SCMs also desire applications for SEC, EC, RM and PAM where vacancies exist. *All amateurs in the United States and Canada are invited to join the Amateur Radio Emergency Corps (ask for Form 7).*

ATLANTIC DIVISION			
Eastern Pennsylvania	W3PYF	Clarence Snyder	717 Porter St.
Maryland-Delaware-D. C.	W3PRL	J. W. Gore	3707 Woodbine Ave.
Southern New Jersey	K2BG	Herbert C. Brooks	800 Lincoln Ave.
Western New York	W2JVV	Edward Graf	81 King St.
Western Pennsylvania	W3NCD	R. M. Heck	RFD 1
CENTRAL DIVISION			
Illinois	W9YIX	George Schreiber	239 S. Scoville Ave.
Indiana	W9BKJ	George H. Graue	824 Home Ave.
Wisconsin	W9RQM	Reno W. Goetsch	929 S. 7th Ave.
DAKOTA DIVISION			
North Dakota	W0KTZ	Elmer J. Gabel	Custer State Park
South Dakota	W0FLP	Les Price	1611 1/2 E. Lake St.
Minnesota	W0MXC	Charles M. Bove	
DELTA DIVISION			
Arkansas	W5FMF	Owen G. Mahaffey	Box 157
Louisiana	W5FMO	Thomas J. Morgavi	3421 Beaulieu St.
Mississippi	W5WZY	Julian G. Blakely	104 N. Poplar St.
Tennessee	W4SCF	Harry C. Simpson	1863 So. Wellington St.
GREAT LAKES DIVISION			
Kentucky	W4SBI	Robert E. Fields	531 Central Ave., (Kentucky side)
Michigan	W8RAE	Thomas G. Mitchell	409 Liberty
Ohio	W8AJW	John E. Sringer	2972 Clague Rd.
HUDSON DIVISION			
Eastern New York	W2ILI	Stephen J. Neason	794 River St.
N. Y. C. & Long Island	W2TUK	Harry J. Dannels	139 East Zoranne Drive
Northern New Jersey	W2VQR	Lloyd H. Manamon	709 Seventh Ave.
MIDWEST DIVISION			
Iowa	W0BDR	Russell B. Marquis	807 North Fifth Ave.
Kansas	W0ICV	Earl N. Johnston	1100 Crest Drive
Missouri	W0GEP	James W. Hoover	15 Sandringham Lane
Nebraska	W0CBH	Floyd B. Campbell	203 W. 8th St.
NEW ENGLAND DIVISION			
Connecticut	W1EFW	Milton E. Chaffee	53 Homedale Ave.
Maine	W1BFI/VYA	Allan D. Duntley	
Eastern Massachusetts	W1ALP	Frank L. Baker, jr.	91 Atlantic St.
Western Massachusetts	W1HKV	Osborne R. McKeagahan	22 Mutter St.
New Hampshire	W1HRS	Harold J. Preble	Route 4
Rhode Island	W1KIK	Walter B. Hanson, jr.	54 Locust St.
Vermont	W1RNA	Robert L. Scott	108 Sias Ave.
NORTHWESTERN DIVISION			
Alaska	KL7AGU	Dave A. Fulton	Box 103
Idaho	W7IUW	Alan K. Ross	2105 Irene St.
Montana	W7CT	Leslie E. Crouter	608 Yellowstone Ave.
Oregon	W7ESJ	Edward F. Conyngham	11901 Powell Blvd.
Washington	W7FIX	Victor S. Gish	511 East 71st St.
PACIFIC DIVISION			
Hawaii	KH6AED	Samuel H. Lewbel	P.O. Box 3564
Nevada	W7IUJ	Ray T. Warner	539 Birch St.
Sanita Clara Valley	W6WGO	R. Paul Tibbs	1946 Harmil Way
East Bay	W6RLB	Guy Black	281 Loucks Ave.
San Francisco	W6GCG	Walter A. Buckley	36 Colonial Way
Sacramento Valley	W6JDN	Harold L. Lucero	1115 Ellinore Ave.
San Joaquin Valley	W6JDN	Edward L. Bewley	421 East Olive St.
ROANOKE DIVISION			
North Carolina	W4WXZ	Charles H. Brydges	3246 Sunset Drive
South Carolina	W4ANK	T. Hunter Wood	1702 North Rhett Ave.
Virginia	W4KX	John Carl Morgan	% Radio Station WFVA, Box 269
West Virginia	W8PQO	Albert H. Hix	1013 Belmont St.
ROCKY MOUNTAIN DIVISION			
Colorado	W0CDX	Karl Brueggeman	1945 Kearny St.
Utah	W7UTM	Floyd L. Hinshaw	165 East 4th, North
Wyoming	W7PKX	Wallace J. Ritter	P.O. Box 797
SOUTHEASTERN DIVISION			
Alabama	W4MI	Joe A. Shannon	
Eastern Florida	W4FWZ	John W. Hollister	3809 Springfield Blvd.
Western Florida	W4MS	Edward J. Collins	1001 E. Blount St.
Georgia	W4NS	George W. Parker	226 Kings Highway
West Indies (Cuba-P.R.-V.I.)	KP4DJ	William Werner	563 Ramon Llovet
Canal Zone	KZSRM	Roger M. Howe	Box 462
SOUTHWESTERN DIVISION			
Los Angeles	W6CMN	William J. Schuch	6707 Beck Ave.
Arizona	W7LVR	Albert Steinbrecher	RFD 5, Box 800
San Diego	W6LRU	Don Stansifer	4477 Pescadero
Santa Barbara	W6QIW	William B. Farwell	90 Grapevine Road
WEST GULF DIVISION			
Northern Texas	W5JQD	Dr. Bruce Craig	1706-27th
Oklahoma	W5RST	Tr. Will G. Crandall	State Veterans Hospital
Southern Texas	W5QDX	Morley Bartholomew	RFD 7, Box 63
New Mexico	W5FPB	Einar H. Morterud	2717 Quincy St., N.E.
CANADIAN DIVISION			
Maritime	VE1OM	Douglas C. Johnson	104 Preston St.
Ontario	VE3IA	G. Eric Farquhar	16 Emerald Crescent
Quebec	VE2GL	Gordon A. Lynn	R.R. No. 1
Alberta	VE6MJ	Sydney T. Jones	10706-57th Ave.
British Columbia	VE7JT	Peter M. McIntyre	981 West 26th Ave.
Yukon	VE4HL	John Polmark	109-13th, N.W.
Manitoba	VE4HL	Harold R. Horn	1044 King St.
Saskatchewan	VE5HR		

* Official appointed to act temporarily in the absence of a regular official.



**Littlefone with
4" Loud Speaker**

**Littlefone Central
Station Antenna**



Mobile Littlefone



hallicrafters

Chicago 24, Illinois

CIVIL DEFENSE

littlefone®

Write Dept. Littlefone for details

2-way FM radio telephone for 30 to 54 Mc. and 144 to 173 Mc.

THE AMERICAN RADIO RELAY LEAGUE, INC.,

is a noncommercial association of radio amateurs, bonded for the promotion of interest in amateur radio communication and experimentation, for the relaying of messages by radio, for the advancement of the radio art and of the public welfare, for the representation of the radio amateur in legislative matters, and for the maintenance of fraternalism and a high standard of conduct.

It is an incorporated association without capital stock, chartered under the laws of Connecticut. Its affairs are governed by a Board of Directors, elected every two years by the general membership. The officers are elected or appointed by the Directors. The League is noncommercial and no one commercially engaged in the manufacture, sale or rental of radio apparatus is eligible to membership on its board.

"Of, by and for the amateur," it numbers within its ranks practically every worth-while amateur in the nation and has a history of glorious achievement as the standard-bearer in amateur affairs.

Inquiries regarding membership are solicited. A bona fide interest in amateur radio is the only essential qualification; ownership of a transmitting station and knowledge of the code are not prerequisite, although full voting membership is granted only to licensed amateurs.

All general correspondence should be addressed to the administrative headquarters at West Hartford, Connecticut.



Past Presidents

HIRAM PERCY MAXIM, W1AW, 1914-1936
EUGENE C. WOODRUFF, W8CMP, 1936-1940
GEORGE W. BAILEY, W2KH, 1940-1952

Officers

President GOODWIN L. DOSLAND, W0TSN
Moorhead, Minnesota
First Vice-President WAYLAND M. GROVES, W5NW
P.O. Box 586, Odessa, Texas
Vice-President FRANCIS E. HANDY, W1BDI
38 La Salle Road, West Hartford, Connecticut
Vice-President PERCY C. NOBLE, W1BVR
37 Broad St., Westfield, Massachusetts
Secretary A. L. BUDLONG, W1BUD
38 La Salle Road, West Hartford, Connecticut
Treasurer DAVID H. HOUGHTON
38 La Salle Road, West Hartford, Connecticut

• • • • •

General Manager A. L. BUDLONG, W1BUD
Communications Manager FRANCIS E. HANDY, W1BDI
Technical Director GEORGE GRAMMER, W1DF
38 La Salle Road, West Hartford, Connecticut
General Counsel PAUL M. SEGAL
816 Connecticut Ave., Washington 6, D.C.

Assistant Secretaries:

JOHN HUNTOON, W1LVQ LEE AURICK, W1RDV
PERRY F. WILLIAMS, W1UED
38 La Salle Road, West Hartford, Connecticut

DIRECTORS

Canada

ALEX REID VE2BE
240 Logan Ave., St. Lambert, P. Q.
Vice-Director: Reginald K. Town VE7AC
2879 Gravelley St., Vancouver 6, B. C.

Atlantic Division

GILBERT L. CROSSLEY W3YA
Dept. of E.E., Penna. State University
State College, Pa.
Vice-Director: Charles O. Badgett W3LVF
725 Garden Road, Glenside, Pa.

Central Division

HARRY M. MATTHEWS W9UQT
702 So. 8th, Springfield, Ill.
Vice-Director: George E. Kelth W9QLZ
RFD 2, Box 22-A, Utica, Ill.

Dakota Division

ALFRED M. GOWAN W0PHR
1012 South Willow Ave., Sioux Falls, S. D.
Vice-Director: Forrest Bryant W0FDS
6840 Harriet Ave., Minneapolis, Minn.

Delta Division

GEORGE H. STEED W5BUX
1912 Beech St., Pine Bluff, Ark.
Vice-Director: George S. Acton W5BMM
Plain Dealing, La.

Great Lakes Division

JOHN H. BRABB W8SPF
708 Ford Bldg., Detroit 26, Mich.
Vice-Director: Robert L. Davis W8EYE
247 Highland Ave., Salem, Ohio

Hudson Division

GEORGE V. COOKE, JR. W2OBU
88-31 239 St., Bellerose 26, N. Y.
Vice-Director: Thomas J. Ryan, Jr. W2NKD
2339 Redwood Rd., Scotch Plains, N. J.

Midwest Division

WILLIAM J. SCHMIDT W0OZN
306 S. Vassar, Wichita, Kansas
Vice-Director: James E. McKim W0MVG
1404 S. Tenth, Salina, Kansas

New England Division

PHILIP S. RAND W1DBM
Route 58, Redding Ridge, Conn.
Vice-Director: Clayton C. Gordon W1HRC
65 Emerson Ave., Pittsfield, Mass.

Northwestern Division

R. REX ROBERTS W7CPY
837 Park Hill Drive, Billings, Mont.
Vice-Director:

Pacific Division

HARRY M. ENGWIGHT W6HC
770 Chapman, San Jose 26, Calif.
Vice-Director:

Roanoke Division

P. LANIER ANDERSON, JR. W4MWH
428 Maple Lane, Danville, Va.
Vice-Director: Theodore P. Mathewson W4FJ
110 N. Colonial Ave., Richmond, Va.

Rocky Mountain Division

CLAUDE M. MAER, JR. W0IC
740 Lafayette St., Denver, Colo.
Vice-Director: Walter M. Reed W0WRO
1355 E. Amherst Circle, Denver, Colo.

Southeastern Division

JAMES P. BORN, JR. W4ZD
25 First Ave., N.E., Atlanta, Ga.
Vice-Director: Randall E. Smith W4DQA
902 Plaza Court, Orlando, Fla.

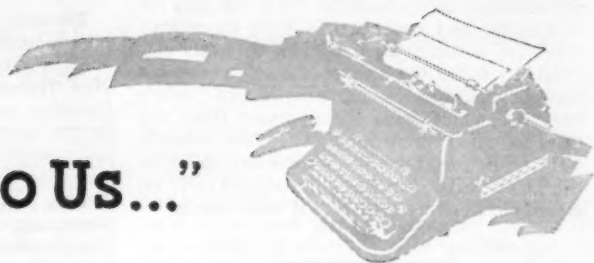
Southwestern Division

WALTER R. JOOS W6EKM
1315 N. Overhill Drive, Inglewood 3, Calif.
Vice-Director: Robert E. Hopper W6YXU
4327 Santa Cruz, San Diego 7, Calif.

West Gulf Division

ROBERT E. COWAN W5CF
3640 Encanto Drive, Fort Worth 9, Texas
Vice-Director: John F. Skelton W5MA
1901 Standish Dr., Irving, Texas

"It Seems to Us..."



ELECTIONS

Our frequent contention that amateurs are pretty much a cross-section of the population is borne out in yet another way by comparing the percentage of votes cast in ARRL director elections with those of national political elections. Over the past six U. S. Presidential elections the national vote has ranged from 51 to 62.7 per cent, while in the League's director elections the vote, in the past five years, has ranged nationally from 53 to 59 per cent, with some division votes as low as 48, and some as high as 65, per cent of those eligible. These figures show that, by and large, amateurs are as interested in the affairs of their organization as citizens generally are in national affairs. This, to us, is a sign of the strength of the organized amateur movement, and speaks well of amateurs as a group.

But curiosity moves us — what happens to the other forty per cent? Have they an active interest in League affairs? Do they realize that the ARRL directors are the people who make the long-range plans and decide policy matters for all League members? . . . that men of judgment and wisdom are needed? If they did, it would seem that the vote would be nearly 100 per cent, for all would be anxious to choose the man they believe most qualified for the director position.

The usual reasons why one may not be able to cast a ballot in a political election don't often operate in League elections. Transportation to the polls is no problem — the ballot-box is your mail box. The difficulty in obtaining absentee ballots doesn't apply — all our votes are "absentee." Temporary absence from town on business won't stymie you — the voting goes on continuously from October first to November twentieth.

One more thing is important — you can't vote for the man you think best if his name isn't on the ballot! Don't leave it to someone else — if you have someone in mind you believe has the qualities and qualifications of directorship, get up a nominating petition signed by ten or more Full Members, and send it into the Secretary before the 20th of September.

Let's make a new record for participation in this autumn's election in the Atlantic, Canadian, Dakota, Delta, Great Lakes, Midwest, Pacific and Southeastern Divisions. Full details are on page 50.

MOBILE MANUAL

League Hq. takes pleasure in announcing the preparation of a new publication, *The Mobile Manual for Radio Amateurs*, another addition to the ARRL Radio Amateur's Library. Now printing, it will be available sometime in August.

Like its slightly older brother, *Single Sideband*, the mobile manual is another demonstration of the thorough coverage *QST* provides in a specialized field, in this case mobile — for nearly all the material has come from the pages of our monthly journal over the past few years. The result is what you might expect — a veritable encyclopedia on mobile techniques — design, construction, installation and operation.

Q-R-MARY

One of the most important and useful tools of the voice operator is phonetics. When conditions are rough and readability is poor, the use of phonetics can be the difference between communication and no communication. It seems to us, however, that sometimes we carry it to extreme.

In identifying your call sign, by all means use phonetics — anytime. But when a 'phone signal is Readability 5 (and except in DX, whoever heard a lesser report?) the only other reason to use phonetics is something like transmitting a trick word, or the address of a message. Yet you've heard many an R5 voice saying, ". . . here in Schenectady, S-Susan, C-Charlie, H-Henry. . . ." Or it might be Philadelphia or Detroit, Springfield or Milwaukee. Or simple operator names like Joe and Bill. There's no need for such phonetics unless your name is Zzyynsklf or unless you live in Bfftsplk Park.

Queen-Roger-Mary and Queen-Tare-Charlie are other cases in point. It has always been a source of amazement that so many of us

install a modulator for the enjoyment of voice communication, and then continue to use abbreviation methods which were designed for telegraphy and never would have come into existence without their need in telegraphing. "QRM" is for the c.w. operator, to save his time in otherwise having to spell out "interference." Voice frees the operator from the need for such abbreviations. 'Phone is much too useful a system of communication to be burdened with techniques designed for an entirely different mode. Say it with words!

A.R.R.L. ROANOKE DIVISION CONVENTION

Old Point Comfort, Va. — August 12th, 13th and 14th

The ARRL Roanoke Division Convention is jointly sponsored this year by the Peninsula Amateur Radio Club and the Tidewater Mobile Radio Club. Convention Hq. will be the Chamberlin Hotel, Old Point Comfort, Virginia. Registration will begin Friday at 5 P.M., followed by a general get-together and dancing in the exclusive private Chamberlin Room Club. On Saturday there will be outstanding speakers on single sideband, antennas, and other subjects. There will be forums on 'phone and c.w. nets, DX round-up, single sideband, MARS, Navy, TVI, RACES and AREC. At the banquet there will be no long speeches but lots of entertainment.

For those who have small children, the hotel will place cots in your room at no additional cost. There will be special programs for children under supervision of trained personnel; also a private dining room for the children during the banquet so that you may be free to enjoy your meal. We hope to have baby sitters that may be employed at the prevailing rates to free you for an evening of dancing.

There will be trips for the ladies to Williamsburg, Jamestown, and Yorktown. A salt-water outdoor pool and a beach are available on the hotel grounds.

Registration fees as follows: full convention privileges, including banquet and dancing, \$6.00; Novices under 20 years of age, \$4.00. There is a special rate of \$10.00 for the OM and XYL. Hotel rates, \$5.00 single, \$8.00 double, and up.

The convention committee feels that you will enjoy and long remember your stay at this wonderful hotel and its Southern hospitality, with its wonderful food, outdoor salt-water pool, beautiful rooms and views overlooking Chesapeake Bay and Hampton Roads.

Reservations should be sent to Jefferson H. Walker, W4AAD, 27 River Road, Warwick, Va.

Hotel reservations should be sent to The Chamberlin Hotel, Old Point Comfort, Va.

COMING A.R.R.L. CONVENTIONS

**August 12th-14th — Roanoke Division,
Old Point Comfort, Va.**

**September 3rd-4th — South Dakota
State, Yankton, S. D.**

**September 30th-October 1st-2nd —
Southwestern Division Convention,
San Diego, Calif.**

**October 15th-16th — Central Division,
South Bend, Ind.**

**October 22nd-23rd — Midwest Division,
Omaha, Neb.**

Strays

The somewhat dubious honor of being the first ham to cause TVI may belong to Tom Marshall, W5RFF. Here's his story: "Back in 1936 or '37 New Haven, Conn., was celebrating its 300th birthday, and I set up a ham station at a booth in the armory. Among the exhibitions was a demonstration of television by the Baird outfit — scanning disk, neon-bulb receiver, and so on. During one of the TV shows the director came screaming out of the darkened tent and made straight for the ham station — yep, we were taking his picture out! To keep peace, we installed a push-button at the TV demonstration and a red light at our station, so when the light went on we stayed off."

As W5RFF says, "What a claim!" But it's probably another ham "first."

— — — — —

Here's another one for the "What's in a call?" department: WN1FEM is a YL, Elizabeth M. White, New London, Conn., but W1MRS, Ralph Saija, Brookline Mass., is an OM!

— — — — —

Ironical, isn't it? Sir Robert Watson Watt, the noted radar pioneer, was fined twelve dollars by Kingston, Ont., authorities for speeding. The police had clocked his car — with radar!

— I.R.T.S. News

— — — — —

W5RFF has been using the multivibrator circuit of Dudley's 50-ke. frequency marker (p. 14, March, 1955, *QST*) to get 10-ke. intervals, the only change from the original circuit being to substitute 500- μ f. silver micas at C_{10} and C_{11} . The multivibrator locks readily with crystals ranging in frequency from 100 to 600 ke. (at even 100-ke. intervals, of course, for 10-ke. output).

— — — — —

W. Bert Knowles, VE3QB, for 22 years ARRL's QSL Manager for all VE3s, was recently the victim of a fatal accident.

From the inception of the present system of Bureau Managers, in August, 1933, Bert had served the hobby he loved so well. There is no question that the major portion of his hobby time was devoted to the tedious job of handling DX QSLs for fellow hams. Bert Knowles' ham career is an outstanding example of unselfish service to the fraternity.

OUR COVER

The diminutive unit shown on this month's cover is a streamlined modern version of the "Little Gem" which appeared in *QST* almost a decade ago. This new measuring device features compactness, simplicity and versatility. For more information see "The Transistorized 'Little Gem'" by *QST* Technical Assistant E. Laird Campbell, W1CUT.

An Improved Antenna Bridge

Increased Accuracy and Convenience in Impedance Measurements

BY R. WADE CAYWOOD,* WIKRD

• Most earlier designs of simple variable-impedance bridges for antenna and other r.f. impedance measurements have been open to serious objections because of inherent inaccuracies. Described here is a circuit that overcomes these objections and offers greater convenience in operation. Also described is a balun of novel construction for eliminating errors in measurements on balanced lines and loads.

It is often desirable to determine the resistance and resonant frequency of an antenna, to check the standing-wave ratio on a transmission line, to find receiver-input impedance, and to make many other r.f. impedance measurements. The antenna bridge described here offers an improved means for making these measurements, and at the same time is simple in design and easy to construct and use.

Fig. 1A is the fundamental circuit of a standard Wheatstone bridge. Fig. 1B shows two adaptations of the Wheatstone bridge for radio-frequency measurements; the similarity between these diagrams and the basic d.c. resistance bridge is obvious. In the development of such bridges, a subsequent step was that of using the adaptation in Fig. 1B to make a fixed-impedance standing-wave-ratio bridge. The schematic circuit diagram of such a bridge is shown in Fig. 3C. R_4 can be a 51-ohm carbon resistor for 50-ohm coaxial line. The two ratio arms consisting of R_2C_2 and R_3C_3 are identical so that the bridge unbalance is minimum when the impedance connected to the output jack is equal to 51 ohms and is a pure resistance. If the impedance differs from 51 ohms the meter reading will not be zero and the instrument can be calibrated either in terms of impedance or standing wave ratio. However, at impedances other than 51 ohms, the accuracy of measurement frequently is not too good.¹

In an attempt to avoid being restricted to a fixed impedance, bridges have been made using a potentiometer in one arm. This seems like an obvious solution, but there are several disadvantages to this type of bridge. Principally, there

is a substantial frequency error because a potentiometer is not a pure resistance but a combination of resistance and reactance, and as the arm of the potentiometer is moved, the ratio of resistance to reactance changes. Hence the accuracy of measurement is relatively poor and the calibration depends on frequency. Thus the substitution of a potentiometer in the simple fixed-resistance bridge is not too good a solution.

A disadvantage of bridges using all resistance arms is that the r.f. power requirements, while not large in terms of watts, are often greater than can be supplied by a grid-dip meter. It therefore becomes necessary to use a transmitter to supply the power, but since even a low-power transmitter generally has an output sufficient to overload the bridge components, some provision must be made for reducing the power to the proper level. A grid-dip meter would be a more convenient power source.

A circuit suggested by S. W. Seeley, W2ZE, offers the possibility of very considerable improvement in both respects. In this arrangement a differential capacitor supplies the variable components of an adjustable-impedance bridge, and since capacitance can be measured much

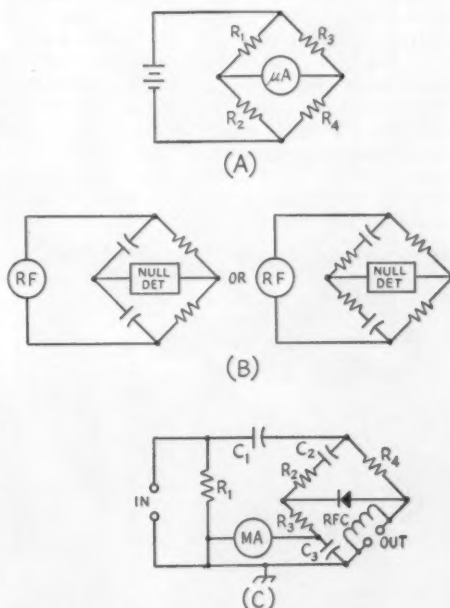


Fig. 1—The basic Wheatstone bridge (A) and adaptations (B) for r.f. use. (C) is a typical practical circuit for a bridge with fixed-resistance arms. C_1 , C_2 and C_3 in this circuit are blocking capacitors.

* Chief Engineer, James Millen Mfg. Co., Malden, Mass.

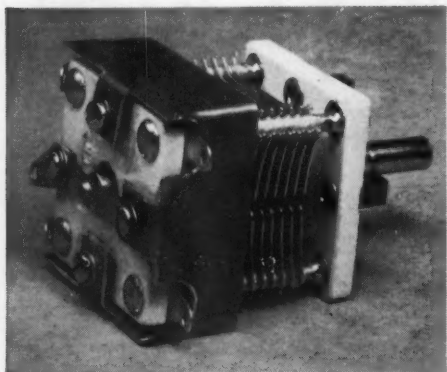
¹ This is partly because the accuracy of such a bridge tends to decrease, as a practical matter, with an increase in the ratio of the impedances in the unknown and standard arms. Also, as has been pointed out many times in *QST* and the *Handbook*, for accurate measurement it is essential that the indicating circuit have good linearity and extremely high impedance compared with the bridge impedance, and that the r.f. input voltage be maintained constant when the load is disconnected or short-circuited for the reference voltmeter setting. — Ed.



The simplicity of the bridge is evident from its appearance. The unknown impedance to be measured is connected to the coaxial jack on the side, and r.f. from a grid-dip meter is coupled to the loop at the left.

more accurately than resistance at r.f., and can easily be kept "pure" at ordinary frequencies, a high order of bridge accuracy becomes possible. A differential capacitor is a dual capacitor so arranged that as the shaft is turned the capacitance of one unit decreases by the same amount that the capacitance of the other increases; in a bridge, the two capacitors become the variable ratio arms. The practical form of W2ZE's circuit is shown in Fig. 2, where C_1 is the differential capacitor. C_1 does not use up any of the r.f. input power, and when a microammeter is used as an indicator, the circuit will operate well from a grid-dip meter source even with loose coupling.

The only fussy part of the bridge is the differential capacitor. For compactness and reduction of stray effects this capacitor, like the one shown in the accompanying photograph, should be designed especially for the purpose. Two identical single capacitors, ganged together so that one is at maximum when the other is at minimum capacitance, may be usable; however, the frequency error will be greater even though the assembly is kept as compact as possible to minimize stray inductance.



The differential capacitor which is the heart of the bridge circuit. The copper shielding fastened to the rear end plate is to prevent stray coupling to other components in the bridge.

Construction

The photographs show the construction of a bridge built to W2ZE's design. As can be seen by looking at the inside view, the unit is not at all complicated; however, it is advisable to stick to the suggested components and layout. Obviously it is undesirable to have unnecessary lead inductances or capacitances between bridge arms. As shown in the inside view of the bridge and in the photograph of the differential capacitor, a copper shield is placed around the top part of the capacitor to shield the stators from the other elements of the bridge. Since the calibration accuracy at the upper end of the frequency range is limited by stray capacitances between bridge elements, the addition of this shielding raises the upper frequency limit at which the bridge maintains its accuracy. With the shield around the condenser the frequency error is very small up to at least 50 Mc.

The choke in the bridge is a miniature powdered-iron-core layer-wound solenoid. The lead

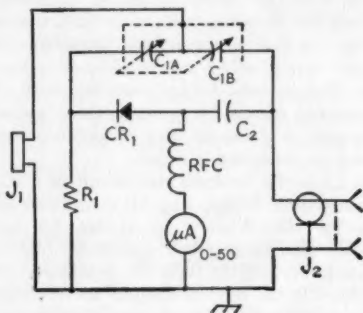


Fig. 2 — Bridge circuit using differential capacitor for adjustment of impedance ratio.

C_1 — Differential capacitor, 11–161 $\mu\text{f.}$ (Millen 28801).

C_2 — 0.01- $\mu\text{f.}$ disk ceramic.

R_1 — 51 ohms, 2-watt composition, 5% tolerance.

J_1 — Crystal socket.

J_2 — Coaxial connector.

RFC — Miniature choke, 200 $\mu\text{h.}$, iron core (Millen J300-200).

CR1 — Germanium diode, 1N34A suitable.

between the coaxial input connector and the capacitor is a short piece of flat copper ribbon. Any revision in the layout that results in longer leads will tend to result in increased frequency error.

The Type 1N34A germanium diode was used because it is satisfactory and because it is generally available. Other types should be equally satisfactory, however.

R.f. is introduced into the bridge circuit through the crystal socket shown at the bottom of the unit in the inside view. Three plug-in pick-up loops are used for coupling the output of a grid-dip meter to the bridge. These coils have 1, 3 and 10 turns, respectively, and are mounted on Millen 37412 300-ohm transmission line plugs. The 10-turn coupling coil, which is 1½ inches in diameter, resonates in the bridge over the approximate range 5.2 to 8.8 Mc., de-

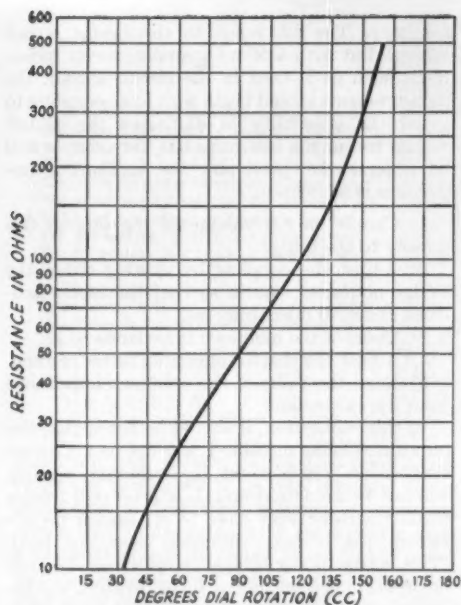


Fig. 3—Calibration curve of the bridge shown in Fig. 2 and the photographs.

pending on the impedance (that is, capacitor) setting. The 3-turn coupling coil, also $1\frac{1}{2}$ inches in diameter, resonates from 15.5 to 30.5 Mc. and the 1-turn coupling coil (1 inch in diameter) resonates from 32 to 84 Mc. With the bridge set to 50 ohms the 10-turn coil and the 3-turn coil result in the same coupling at 12 Mc.; consequently, the 10-turn coupling coil should be used for measurements below 12 Mc. The 3-turn coil and the 1-turn coil result in approximately the same coupling at 40 Mc.; consequently, the 3-turn coil should be used for measurements between 12 and 40 Mc. and the 1-turn coil should be used above 40 Mc. In general, the coupling coil closest to resonance at the particular capacitor setting in use should be chosen. It is, of course, possible to make coupling coils that will be resonant at the particular frequency for which a measurement is desired, but experience has

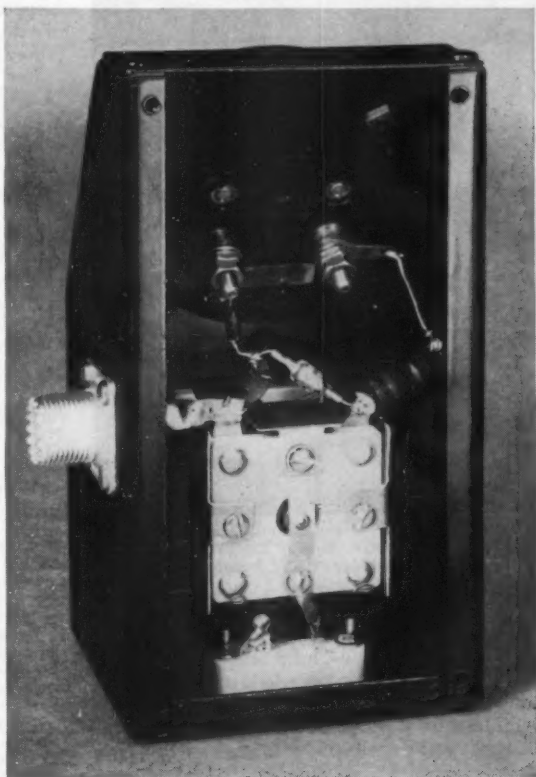
shown that the three coils suggested cover the range adequately. Other coils would be required only under certain very special circumstances.

The 3-turn coupling coil was made by threading the 3 turns through a piece of spaghetti cut to the proper length. The 10-turn link can be wrapped in insulating tape and thoroughly doped in coil cement, or the coil can have a coating of vinylite built up on it by repeated dipping in liquid vinylite material which is readily available for caulking and waterproofing. This material apparently has no harmful effect upon the coils.

Calibration

The theoretical calibration of angular setting of the capacitor rotor vs. impedance is a shallow S-shaped curve, when plotted on semilog paper, symmetrical with respect to the design center impedance. The curve for the bridge described here is shown in Fig. 3.

A similar curve can be constructed for a given bridge by connecting carbon resistors of various values between 5 and 500 ohms to the output connector and adjusting the capacitor for a null in each case, using a calibrated grid-dip meter as the source of an r.f. voltage of known frequency. A similar procedure at various frequencies within the range of the grid-dip meter will show whether there is any appreciable frequency error, and if so, the frequency at which it tends to become im-



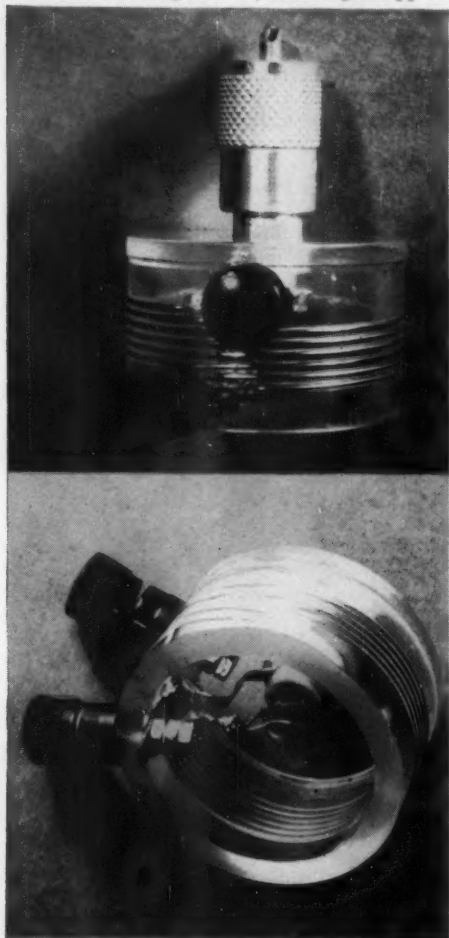
Inside view of the bridge. Components are easily identified with the possible exception of the miniature choke, which is mounted between the left-hand meter terminal and the junction between the 1N34A and the ceramic blocking capacitor.

portant. Lead length between the body of the test resistor and J_2 should be kept to a minimum, particularly with the lower resistance values.

For highest calibration accuracy the test resistors should be measured with an accurate resistance bridge or ohmmeter so their actual resistance is known. If suitable instruments are not available for measuring the resistances, resistors having 5 per cent tolerances or less should be used.

Applications

When used with coaxial lines or other loads that can have one side grounded, the bridge is applied



Two views of the wound balun. This circuit covers the 10-20-meter range. Similar baluns for other frequencies may be designed and constructed by the method outlined in the text.

to amateur antenna and impedance problems in exactly the same way that the older-type bridges, both fixed and variable, have been applied. Since this subject has been very adequately covered in amateur publications, we will add only a few notes here. The only real difference between this and the previous instruments is the ease with which measurements can be made and the improved

accuracy. The r.f. input to the bridge is not critical, but with a 50-microampere meter movement such as is used in the circuit shown, the measurements should begin with loose coupling to avoid the possibility of damaging the meter. Actual use of the instrument is very simple and in general the procedure for measuring impedance is as follows:

- 1) Couple an r.f. voltage of the desired frequency to the bridge.
- 2) Adjust the coupling by moving either the bridge or the r.f. source so that the meter indicates about 40 microamperes.
- 3) Connect the unknown impedance to J_2 .
- 4) Adjust the dial for minimum meter reading.
- 5) Read the value of the unknown impedance from the calibration.

In this connection, it should be noted that the impedance being measured may not be a pure resistance, in which event the minimum reading will not be an actual null. If a good null (meter reading zero or very close to it) cannot be obtained, the bridge calibration does not hold. (This is true of any bridge circuit which does not incorporate special means for separating the resistive and reactive components of the unknown impedance.) Conversely, a complete null does indicate that the unknown impedance is a pure resistance. With complex unknowns, the reactive component can be tuned out by one of a number of well-known methods, leaving only the resistive component to be measured by the bridge. In such a case, the criterion for proper reactance compensation is the fact that the null is complete.

For s.w.r. checks the bridge capacitor should be set to the calibration point corresponding to the characteristic impedance of the coaxial transmission line in which the s.w.r. is to be measured. This setting should be left unchanged during any subsequent adjustments to matching devices, the object being to adjust the matching circuit to obtain the lowest possible reading on the meter. As is usual, a complete null indicates a 1-to-1 standing-wave ratio.²

Balanced lines or loads may be measured with the bridge by using a circuit that provides suitable balanced-to-unbalanced coupling between the bridge and load. The wound balun devised by W2ZE and described below is a very convenient form of such circuit.

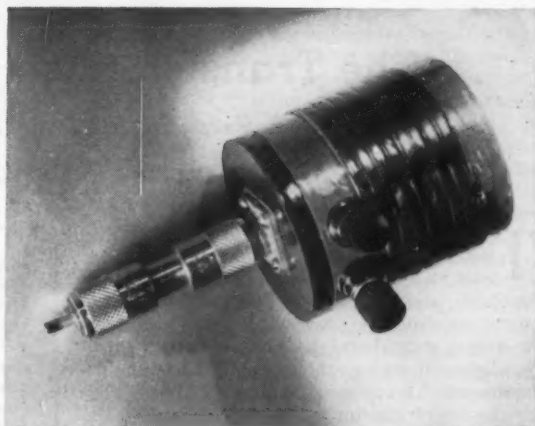
The Wound Balun

A wound balun is simply an accurate 2-to-1 auto transformer with the residual reactances

² Although the factors mentioned in Footnote 1 do not affect the accuracy of impedance measurement with the bridge described, since the bridge is always adjusted for a null in such measurements, they do apply with full weight to the measurement of standing-wave ratios higher than 1 to 1. For s.w.r. measurement, provision for checking the input voltage should be included in the circuit of Fig. 2, and a resistance of at least 10,000 ohms—preferably as much as 50,000—should be placed in series with the microammeter. However, these precautions are not necessary for purely qualitative comparisons nor for facilitating matching-circuit adjustments where the object is to attain the lowest possible meter reading. Most amateur uses of an s.w.r. bridge are in this category.—Ed.

A balun for 40 and 80 meters, using 150-ohm Twin-Lead (Amphenol 14-079 or Alpha 1151) for the bifilar winding. There are 8 turns of Twin-Lead on 2 $\frac{3}{4}$ -inch diameter bakelite tubing. The shunt tuning capacitance for 80 meters is 62 $\mu\text{f.}$; no shunt capacitor is needed for 40 meters. The series capacitance for 80 meters is 0.0045 $\mu\text{f.}$ and for 40 meters is 0.001 $\mu\text{f.}$

This model uses a female coaxial connector, which accounts for the double-ended male connector shown in place.



tuned out and as tight coupling as possible between the two halves of its total winding. If the impedance is measured between a grounded center-tap and one terminal of the winding when a balanced load is connected across it, the 2-to-1 turns ratio produces a 4-to-1 step-down in the impedance measurement. For example, a properly-terminated balanced 600-ohm line connected to the outside terminals of the winding would be measured as 150 ohms between the grounded center-tap and either end. This means that the readings of the antenna bridge must be multiplied by four when using the balun. Thus the range of a 5-500-ohm bridge becomes 20-2000 ohms for balanced loads. This coincides with the usual higher impedances of balanced lines. Use of a balun maintains balance during measurement and thus obviates the wild errors usually encountered when one tries to measure any balanced-line impedance without first converting it to a single-ended load.

There are five principal requirements for the construction of an accurate wound balun:

- 1) The two halves of the winding must be as nearly equal and as symmetrically positioned as possible.
- 2) The coupling between the two halves of the winding must be as close to 100 per cent as possible.
- 3) The Q of the winding must be high.
- 4) The total inductance must be resonated to the frequency of operation by a shunt capacitor across the balanced terminals.
- 5) The residual leakage reactances should be tuned out by means of a capacitor in series with the "hot" single-ended terminal.

These five objectives are accomplished in the following manner:

Symmetry and tight coupling, (1) and (2), are obtained by making the two halves of the winding bifilar. In the 10-20 meter balun illustrated the 2-inch diameter lucite form is wound with its 3-turn windings paired in double-thread, 7 t.p.i. lathe-cut grooves. In winding, the wire starts at the beginning of one thread, continues for three turns to the end of that thread, goes through a hole to the inside of the form, back to a hole

leading out to the start of the second thread, then continues in that thread for three more turns to the end of the winding. The center of the wire, where it goes from the end of the first thread to the beginning of the second, is the exact physical (and electrical) center of the two windings. That point is joined by a short, heavy strap directly to the body of the male coaxial connector.

The Q of the illustrated balun turned out to be 235 at 14.3 Mc., which is the equivalent of about a 50,000-ohm resistor in shunt with the balanced load to be measured. This causes an error of about 4 per cent in the reading of a 2000-ohm load but only 1 per cent for a 500-ohm load.

When this balun was tuned to operate at 28 Mc., it showed almost exactly the same shunt resistance. Several transmission-line baluns that were tried showed four to five times the error of this wound balun due to their lower Q .

Tuning out the residual reactances of the wound balun can be done rather easily with the aid of a grid-dip meter. The problem is somewhat simplified if one first calculates the amount of capacitance required to resonate the total winding to the center of the frequency band in which it is to be used. In the case of the illustrated balun, the Lightning Calculator indicated 2.6 $\mu\text{f.}$ which would require a total capacitance of 49 $\mu\text{f.}$ to resonate it to the center of the 20-meter band. It was estimated that the coil distributed capacitance would be about 10 $\mu\text{f.}$ so a fixed 39- $\mu\text{f.}$ ceramic was connected across the balanced terminals. The grid-dipper then showed resonance at 14.3 Mc., which was plenty close enough.

At first it was thought that the small residual leakage reactances could be tolerated without a correcting condenser in series with the single-ended output. But it turned out to be such an easy job to find the correct value and put it in, and the increased accuracy thus gained was so immediately apparent, that it seems well worth while to include it.

As a starter, it was assumed that the leakage inductance of the coil and leads would be somewhere in the neighborhood of 2 to 3 per cent of the total coil inductance. This would take a con-

(Continued on page 110)

The Transistorized "Little Gem"

A Versatile R.F. and D.C. Meter

BY E. LAIRD CAMPBELL, W1CUT

THE high cost of transistors has limited transistor use in amateur radio. Recently, however, low-cost transistors have been made available, and we can expect to see them in frequent use. Since the transistor is very small, light in weight, rugged and easily powered by a small pen-light cell, its logical application is to portable equipment. The above advantages obviously add up to the transistor's application to portable measuring devices for the ham. The instrument described here can be used in five different ways: field-strength meter, wavemeter, microammeter, milliammeter, and 'phone quality monitor. It is a "natural" for mobile work as it can be carried about without restricting wires or bulky batteries.

The transistor in this unit operates as a current amplifier to multiply the input signal to a value high enough to be indicated on a 0-1 milliammeter. This allows a less expensive and more rugged milliammeter to be used instead of the usual expensive microammeter.

The diagram of Fig. 1 shows the circuit of the instrument. When used as a field-strength meter or a wavemeter, the signal from the source to be measured is received by the antenna and tuned by L_1C_1 . It is then rectified by the crystal diode and impressed on the transistor where it is amplified and indicated on the meter. Since the transistor inherently has a static collector current under no-signal conditions, some means must be provided to electrically balance or zero the meter. This is accomplished by adjusting the variable

• Almost 10 years ago (January, 1946) *QST* carried a description of the "Little Gem," an absorption-type wavemeter that doubled as 'phone monitor and field-strength indicator. By adding the gain of a transistor d.c. amplifier stage, the sensitivity of the gadget is increased considerably, and what is normally a milliammeter becomes a microammeter. This will be found to be a handy and useful instrument to have around the shack. Once you have used it you will see why it is called the "Little Gem."

resistance, R_1 . If the signal being measured is very strong, no external antenna will be necessary for full-scale deflection. When more sensitivity is needed, a short piece of stiff wire can be connected to the antenna binding post.

If it is desired to check the quality of a 'phone signal, it is only necessary to plug a pair of headphones into the 'phone jack. The closed-circuit jack isolates the meter from the circuit and allows the amplified audio component of the rectified signal to be heard.

When the instrument is to be used as a microammeter, the transistor is switched from the diode rectifier circuit to polarized pin jacks mounted on the cabinet. The transistor continues to operate as a current amplifier, and full-scale deflection can be obtained with a very small cur-



The transistorized "Little Gem" with plug-in coils which provide coverage of all amateur bands, 160 through 6 meters. The 'phone jack is mounted on the side of the cabinet and insulated by fiber washers.

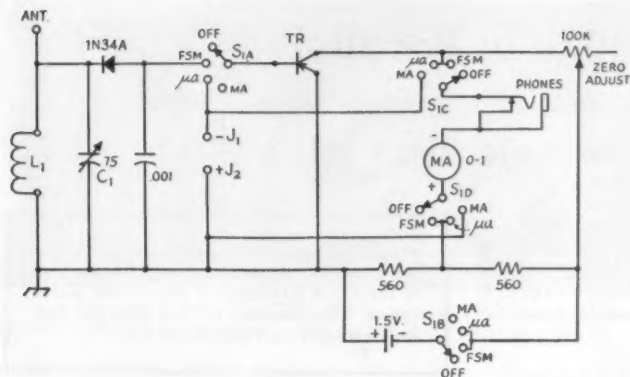


Fig. 1 — Schematic diagram of the transistorized "Little Gem." All resistors $\frac{1}{2}$ watt.

- L₁ — 1700–3000 kc.: 100 turns No. 30 enam., close-wound on $\frac{3}{4}$ -inch form
- 3300–7600 kc.: 32 turns No. 30 enam., close-wound on $\frac{3}{4}$ -inch form
- 12–30 Mc.: 13 turns No. 20 enam., $\frac{3}{4}$ -inch form, spaced diameter of wire
- 30–80 Mc.: 3 turns No. 20 enam., $\frac{3}{4}$ -inch form, spaced diameter of wire
- 40–110 Mc.: short loop of No. 10 enam. (plugged directly into coil socket)

All coils are wound on Amphenol 24-5H forms.

C₁ — 75- μ mf. midget variable condenser (Millen 20075)

S₁ — 4-pos. 4-pole miniature steatite rotary switch (Centralab PA-2011)

J₁, J₂ — Nylon tip jack (Johnson 105-602-1)

TR — PNP junction transistor (Hydro-Aire CQ-1)

rent flow at the input. Since the basic movement of the meter is 0–1 ma., switching is provided to isolate the meter for milliamperere readings. The two pin jacks used for microampere readings are also used for measuring milliamperes.

Construction

The unit is constructed in a 4 × 2 × 4-inch utility cabinet. Placement of the components is not critical for operation, but some care must be exercised because of space considerations. The meter and the tuning control, C₁, are mounted on the removable front plate. Since the meter is mounted at the very top of the face plate, some of the lip on the box will have to be removed to allow the meter to fit properly. Function switch, zero adjust control and pin jacks are all mounted on one end of the box, with the coil socket and antenna post on the other. The 'phone jack and holding handle are secured to opposite sides of the box. The handle on this unit was placed for a left-handed person but it can be mounted on either side. The transistor is supported by its own leads, and great care must be exercised in soldering because an excess of heat will permanently impair its operation. It is good practice to hold

the leads of the transistor with long-nose pliers while soldering so the heat will flow into the pliers and not the transistor. A small pen-light cell is used to power the transistor and it is supported by soldering the plus terminal of the cell to the tie-bolt of the switch assembly. The negative or case side of the cell is not supported and the lead to it is soldered to the bottom of the cell. Plug-in coils for the unit are wound on Amphenol miniature plug-in coil forms which require a special socket (Amphenol 78-858). The range of the coils in this set covers 1700 kc. to 120 Mc. If it is desired to include the 144–148 Mc. band, a smaller tuning capacitor should be used.

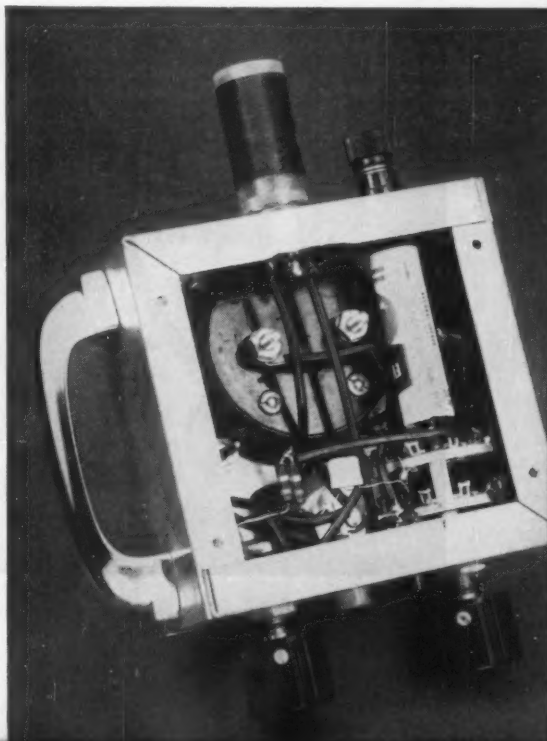
Operation

To use the instrument as a field-strength meter or microammeter, the function switch is turned to the desired position and the meter is balanced by rotating the zero adjust

control until the pointer is set on zero. The meter is now ready for use and no further adjustments are necessary. To measure the strength of a signal, the tuning control is turned until the maximum reading is found. Once the tuning control is set, relative strength measurements can be made for different antenna conditions. A calibration chart

(Continued on page 112)

Bottom view showing placement of components. The transistor can be seen at bottom center supported by its own leads. The pen-light cell is supported by soldering the plus cap to the switch tie bolt.



807s in Parallel

75- to 150-Watt Amplifier with Pi-Section Output

BY FRANCIS M. YANCEY,* K4CDO

THE amplifier shown in the photographs was designed to cover all bands from 3.5 to 30 Mc. It can be operated at an input of 150 watts on c.w., or 120 watts on 'phone. However, it will operate efficiently at 75 watts input for Novice use.

Circuit

A pair of 807s in parallel is shown in the circuit diagram of Fig. 1. A pair of 1625s may be substituted if a 12.6-volt filament transformer is provided.

The amplifier is capacitively coupled to the driver through the 100- μ f. mica capacitor, C_1 . (If the driver includes an output coupling capacitor, C_1 may be omitted, of course.) L_1 and L_2 are small inductors which, in conjunction with R_2 and R_3 in the screen leads, are used for the suppression of v.h.f. parasitics.

A combination of battery and grid-leak bias is used. Since the screens are operated from a low-voltage source, the fixed bias provided by the battery will cut the input to the 807s to zero when excitation is removed, as in keying preceding stages for c.w. operation. When the screens are supplied through a dropping resistor from the

* 523 Taylor St., Lexington, Va.

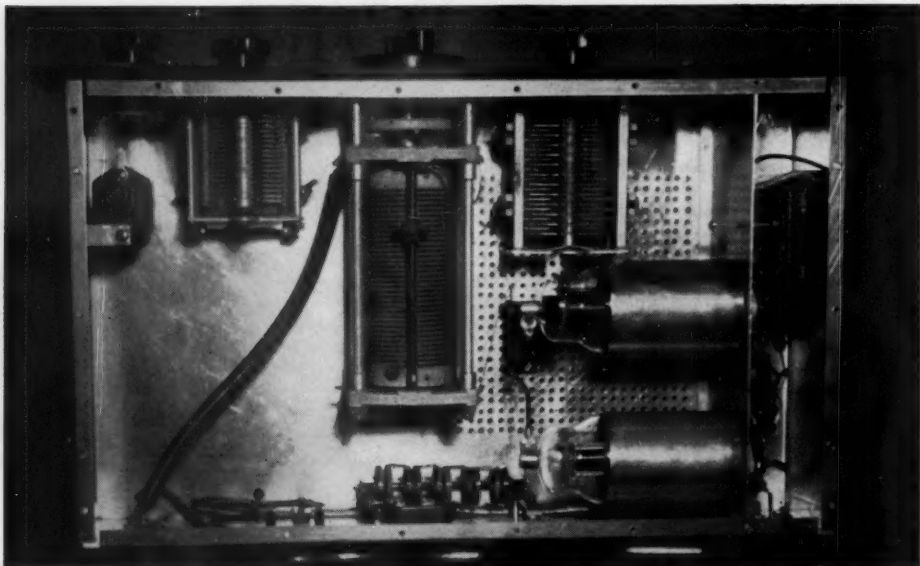
Top view of the parallel 807 amplifier. The variable output capacitor is at the upper left with the fixed mica capacitors and switch in the corner. The variable input capacitor is to the right of the variable inductor. The r.f. choke and by-pass fastened to the rear wall of the chassis are in the plate circuit. The biasing battery can be seen in the compartment to the right which also houses the input-circuit components. L_3 and C_6 were not used in this unit.

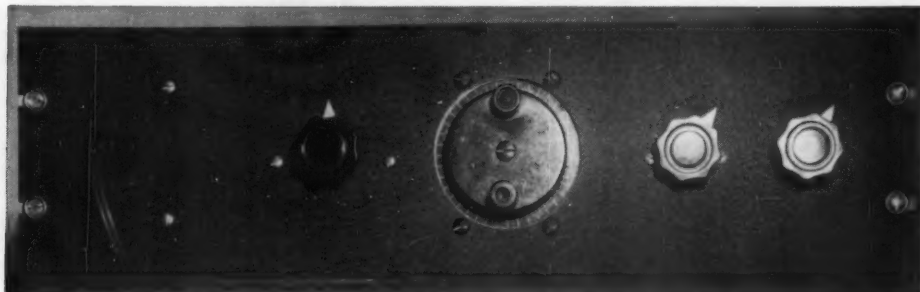
• Judging from our mailbag, the greatest demand in transmitters these days is for a job running at 100 to 150 watts input. This parallel 807 job fills the bill quite simply and inexpensively.

plate supply, as required for plate-screen modulation, the battery will hold the input to a safe level in case of excitation failure, although the input will not be reduced to zero.

A pi-section tank circuit is used in the output, and parallel plate feed is therefore necessary. Either a rotary inductor from a surplus BC-375-E antenna-tuning unit or a Johnson type 229-201 inductor may be used as the variable inductor, L_4 . L_3 is a separate inductor for 10-meter operation. It will not be needed if the Johnson inductor is used, or if the surplus inductor is used and 10-meter operation is not required.

The required output capacitance is furnished by a combination of a variable capacitor, C_4 , and several fixed capacitors that may be switched in parallel with the variable. A total of about 2000 μ f. should be provided. For a continuous range of capacitance, each of the fixed capacitors





Panel view of the 150-watt amplifier showing the grid-meter jack, and controls for the pi-section input capacitor, variable inductor, variable output capacitor and fixed-capacitor switch.

should have a capacitance not greater than the maximum capacitance of the variable. As an example, a 500- μf . variable and three 500- μf . fixed capacitors may be used. A 250- μf . variable, on the other hand, will require seven 250- μf . fixed capacitors and a switch to accommodate them.

RFC_2 removes the d.c. plate voltage from across the input and output tuning capacitors, reducing the required voltage rating of these capacitors. It also provides protection against plate voltage appearing on the transmission line should the plate blocking capacitor, C_3 , break down. In this event, RFC_2 will short-circuit the plate supply. If the primary of the plate transformer is provided with a 3-ampere fuse, the supply will be protected.

C_6 may be useful in localities where TVI is bothersome on one particular v.h.f. channel. In this case, the capacitor can be series-resonated to the particular channel by adjusting its lead length (represented by L_6). It should be connected directly across the output coax connector.

Plate and grid milliammeters are not included in the unit, but are mounted externally on another panel to keep them out of r.f. fields. J_2 is provided for plugging in a cord from the grid milliammeter while checking grid current. The plate meter is wired in permanently through terminals at the rear of the chassis. If desired, the jack can be omitted and the grid milliammeter wired in permanently, also.

Construction

An inverted $10 \times 17 \times 4$ -inch aluminum chassis is used as a shielding enclosure for the amplifier. A standard bottom cover is used as the top cover. The chassis and the cover are perforated in the area near the tubes to provide ventilation. Holes in addition to those provided are drilled in the cover and along the lips of the chassis so that the cover may be secured tightly to the chassis with No. 6 self-tapping screws. The chassis is centered behind a standard $5\frac{1}{4}$ -inch aluminum rack panel.

The 807s are mounted horizontally from a

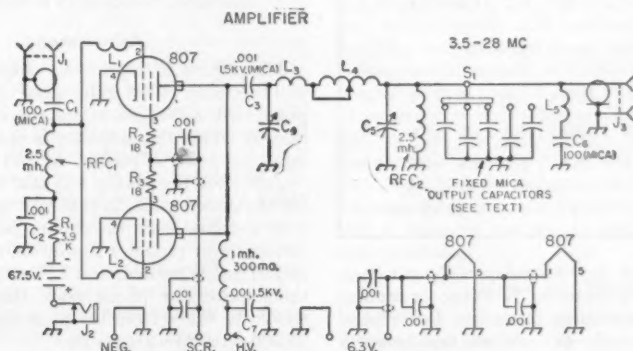


Fig. 1 — Circuit of the parallel 807 amplifier.

- C_1 — Not needed if driver has output coupling capacitor.
- C_4 — 250- μf . 1200-volt variable (National TMS-250 or TMS-300, Bud CE-2007 or similar, 0.03-inch plate spacing). See text.
- C_5 — 250 μf . or larger. See text. For low-impedance output, receiving spacing adequate. (Johnson 140R12, Bud MC-1860, MC-909 or MC-910, Hammarlund RMC-325-S, MC-250-M or MC-325-M).
- L_1, L_2 — 22 turns No. 30 enam., $\frac{1}{4}$ -inch diam., $\frac{3}{8}$ inch long.

- L_3 — 3 turns No. 10, $\frac{3}{4}$ -inch diam., $\frac{3}{4}$ inch long (see text).
- L_4 — Rotary inductor (see text).
- L_5 — See text.
- J_1 — RCA-type shielded phono jack.
- J_2 — Closed-circuit 'phone jack.
- J_3 — Coax connector.
- S_1 — Progressively-shortening rotary switch (Centralab P-121 index head, P15 wafer).

All capacitances less than 0.001 μf . are given in μf . All fixed capacitors disk ceramic unless otherwise specified. All resistors $\frac{1}{2}$ watt unless otherwise indicated.

partition spanning the chassis. This partition is made from a piece of aluminum cut $4\frac{1}{2}$ inches wide by 10 inches long. Half-inch lips are bent over at the front end and along the bottom edge for fastening it with machine screws to the front wall and bottom of the chassis. The partition is spaced 2 inches from the end of the chassis. The tubes are provided with aluminum shield cans, and the sockets placed sufficiently far to the rear to leave space for the input capacitor, C_3 .

Most of the assembly and wiring to the sockets can be done before the partition is fastened permanently in place. Pins 4 and 5 of each socket should be grounded right at the socket. The No. 2

bottom end of RFC_1 and an insulated tie point, and the grid by-pass, C_2 , is connected between the bottom end of the choke and a ground on the partition. The negative terminal of the biasing battery is also connected to this tie point, while the positive terminal goes to J_2 .

Three shielded and by-passed leads are prepared as described in the TVI chapter of the ARRL *Handbook*. One lead is connected to the junction of R_2 and R_3 . The other two leads are fastened to the No. 1 pins of the sockets. After the partition has been fastened in place, the lead from the junction of the resistors should be connected to the screen-voltage input terminal. The other two leads both are run together to the ungrounded heater input terminal. The shields of these three leads are grounded at both ends, to each other, and to the chassis at several points.

The plate blocking capacitor, C_3 , is mounted with one of its terminals central in respect to the two 807 plate caps to permit plate leads of equal length. The parallel-feed plate choke, RFC_3 , is mounted off the rear wall of the chassis, with its cold end close to the high-voltage input terminal. The plate by-pass, C_7 , is fastened against the rear wall of the chassis, and is connected between the cold end of the r.f. choke and the high-voltage input terminal with the shortest possible leads.

The variable inductor cannot be mounted centrally in the chassis without interfering with the removal of the 807s. It is placed an inch or so away from the plate caps of the tubes, and the input and variable output capacitors are spaced symmetrically on either side. The fixed capacitors in parallel with C_5 are stacked up and fastened to a grounding bracket attached to the left-hand end of the chassis. The front terminals of these capacitors are connected to the terminals of S_1 mounted immediately in front.

Adjustment

The values of input and output capacitance and the value of the inductance to be used in the pi network will depend upon the voltage and current at which the amplifier is operated. For full input on c.w., a voltage of 750 at 200 ma. is required for the plates, and 250 volts at 12 ma. for the screen grids. In this case, screen voltage is best obtained from the exciter plate supply. For full input on 'phone, a supply delivering 600 volts at 200 ma. is needed, and 275 volts at 13 ma. for the screens. For 'phone work, the screen voltage should be taken from the plate supply through a 25,000-ohm 20-watt resistor.

For Novice operation, the amplifier can be operated, for instance, at 500 volts, 150 ma. with both tubes in use, or at 750 volts, 100 ma. with one of the tubes removed.

An accompanying table shows the values of input and output capacitance and the inductance required for a tank-circuit Q of 12 and 50-ohm output under the four operating conditions described above. The Johnson inductor does not have sufficient inductance for a Q of 12 under

(Continued on page 112)

OUTPUT-CIRCUIT VALUES

Band (Mc.)	3.5	3.5	7	14	21	28
750 volts, 100 ma. (3750 ohms)						
C_{IN} (uuf.)	150	230 ¹	75	38	25	20
C_{OUT} (uuf.)	910	1700	450	225	150	110
L (uh.)	14.8	10.0	7.4	3.7	2.5	1.8
750 volts, 200 ma. (1875 ohms)						
C_{IN} (uuf.)	300	250 ²	150	75	50	37
C_{OUT} (uuf.)	1570	1160	785	390	260	195
L (uh.)	7.9	9.3	4.0	2.0	1.3	1.0
500 volts, 150 ma. (1666 ohms)						
C_{IN} (uuf.)	340	250 ³	170	85	55	40
C_{OUT} (uuf.)	1680	1100	840	420	280	210
L (uh.)	7.3	9.3	3.5	1.8	1.2	0.9
600 volts, 200 ma. (1500 ohms)						
C_{IN} (uuf.)	380	250 ⁴	190	95	63	47
C_{OUT} (uuf.)	1820	1000	910	455	300	227
L (uh.)	6.4	9.3	3.2	1.6	1.1	0.8
¹ $Q = 19$ ² $Q = 10$ ³ $Q = 9$ ⁴ $Q = 8$ All others $Q = 12$						

pins are joined by the two resistors R_2 and R_3 in series. RFC_1 is a National R-100-S, or similar model, with an insulating mounting. It is placed centrally between the two sockets and between the partition and the end of the chassis. It is eventually fastened against the bottom of the chassis. However, until the assembly is ready to be fastened in place, it is suspended by its leads. The two parasitic suppressor chokes, L_1 and L_2 , are connected between the No. 2 pins on the sockets and the top of RFC_1 . If C_1 is used, it should be connected between the top of the r.f. choke and the excitation input connector, J_1 . Otherwise, a short piece of wire should be substituted. The grid leak, R_1 , is mounted between the

Power and Meter Facts in S.S.B. Operation

Interpreting the Linear-Amplifier Plate Meter Reading

BY HOWARD F. WRIGHT, JR.,* WIPNB

• Here is some down-to-earth talk about linear amplifiers, power ratings and meter readings that is "must" reading for all s.s.b. enthusiasts. WIPNB presents the case in simple, nontechnical language and with illustrations that clearly demonstrate the basic principles.

DID you ever see an article mainly concerning the plate meters of final r.f. amplifiers? For that matter, have you ever given the subject much thought? Well, if not, it's certain that you have never used a linear amplifier in single-sideband suppressed-carrier operation. Of course, if you are a person with absolutely no aspirations toward s.s.b. in the future, you might be excused for saying, "Who cares?" However, the way things are progressing on the "Donald Duck" front, I think there are many who will be interested in the following material.

Why all the fuss about meters? In the days of regular a.m. there wasn't much concern. The d.c. plate meter gave most of the answers without complaint. Watch the meter. Tune up the rig. Figure the power input — no strain, no pain! What could be neater? To say that this no longer holds true with a linear amplifier in suppressed-carrier service would be quite an understatement. Strong men have wept bitter tears and spent sleepless nights because of the behavior (or misbehavior) of their linear's plate meter. Why? Simply because most of us seem to find it extremely difficult to modify our nearly complete, all-abiding faith in the value of the plate meter in indicating final amplifier performance.

Let's get down to brass tacks. The attitude of an amateur toward the plate meter of his linear final, under voice conditions, is of great importance. It could, from a broad point of view, mean complete success or partial failure of amateur narrow-band communication techniques.

Why does the d.c. plate milliammeter fall down so badly in indicating the performance of amplifiers in s.s.b. voice service? It's because the meter is no longer able to settle at a steady value as it did in the amplification of unvarying carrier signals. The voice modulation consists of sporadic bursts of energy. They say, "The hand is faster than the eye." If so, the voice is certainly faster than the meter. The meter just doesn't move rapidly enough. It starts to follow the first voice impulse up, but moves so slowly that it meets the signal coming down. Then it tries to follow down-

ward. In this it also fails. If a constant sound is used instead of words, the meter stabilizes at an "average" value. When the signal varies with the syllables of speech, the meter bobbles around. The amount of movement depends upon many factors. Meters can have differing time constants (speeds of response). Different voices contain varying amounts of "average" power. The amount of swing depends, to some degree, upon the class of amplifier operation: AB₁, AB₂, or B.

Distortion

A "linear" must amplify the signal from its exciter without changing the waveshape of the original signal. Any change of waveshape is distortion. Distortion means that new signals are generated. These new signals result in splatter. Serious splatter needs no comment.

Every linear amplifier has an amplitude point at which it will produce no further undistorted output. Although the driving signal continues to increase, the output no longer increases in exact proportion. While any change of the signal waveshape at levels other than this maximum value also causes some trouble, it is most imperative that the "limiting" or "flattening" point not be exceeded.

I have previously indicated that the plate meter is basically incapable of indicating the peaks of a voice signal. Any relationship between voice excursions of the plate meter, as it measures d.c. power input, and undistorted unflattened amplifier output is apt to be purely coincidental.

We now have both elements of a conflict. On one hand there are the years of reliance upon the plate meter in indicating amplifier performance, and on the other the meter's basic inability to show lack of linearity. If the meter is such a poor performer, why do we continue to use it? Simply because, when properly interpreted, the meter is still a valuable gadget. It just needs a bit of understanding.

Meter vs. 'Scope

Articles concerning linear-amplifier adjustment make adequately clear the fact that the oscilloscope is the best tool for indicating performance. Whether the use of this valuable instrument is any more vital to the adjustment of a s.s.b. transmitter than it is to making a conventional a.m. 'phone station work properly might be a matter for debate. While a gratifying number of amateurs are now using 'scopes, it would be unrealistic to think that all s.s.b. stations will ever be monitored at all times by operators using such instruments. In fact, an operator who understands what his plate meter means, in conjunction with some

* 55 Sigourney St., Bristol, Conn.

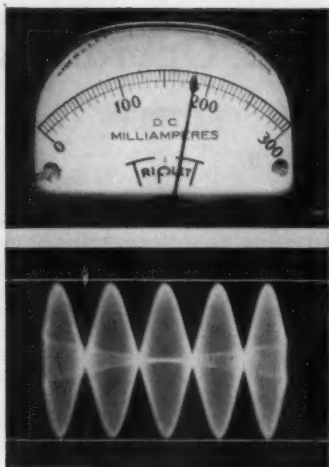


Fig. 1

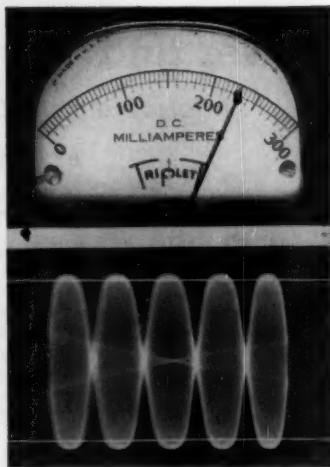


Fig. 2

Each of the accompanying photographs consists of a comparison between the plate milliammeter reading and the output waveshape of a linear amplifier. While each picture shows a different type of signal input, actual amplifier adjustment remains unchanged in all cases. The purpose of the comparison is to demonstrate the action of the average-reading meter as compared to the instantaneous-reading 'scope while indicating signals of varying wave-shapes.

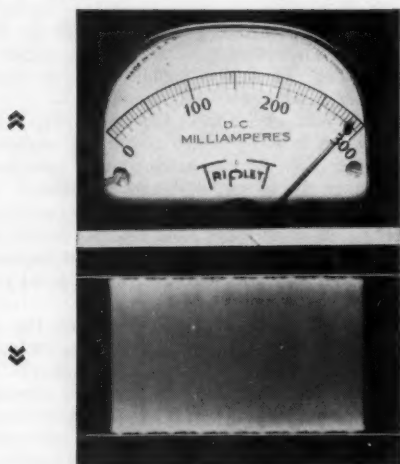


Fig. 3

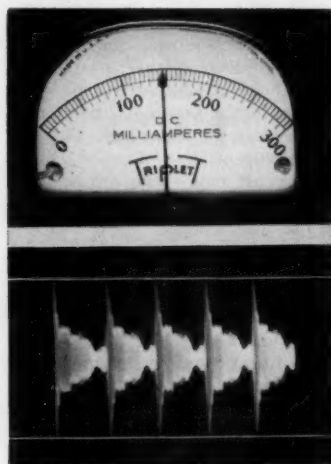


Fig. 4

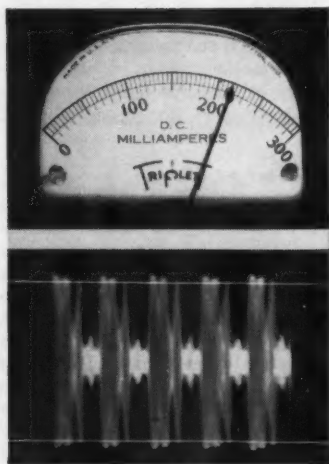


Fig. 5

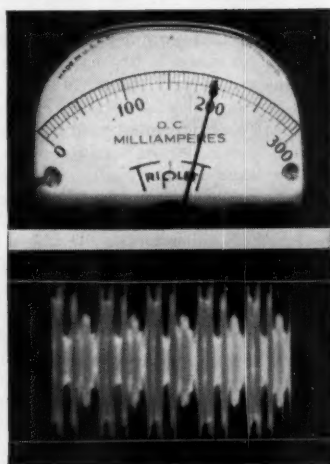


Fig. 6

form of output indication, can do quite well with no 'scope.

Each of the accompanying photographs shows a different condition of amplifier operation or type of signal input as seen on both a 'scope and the d.c. plate milliammeter. The purpose is to demonstrate the action of the average-reading meter as compared to the instantaneous-reading 'scope. Both continuous signals and voice are used.

Fig. 1 shows a two-tone test signal. This type of signal is used to determine linearity and lack of distortion on all parts of the waveshape. At this time, notice only one thing. The top of the pattern remains unflattened and fills up the space between the limit lines. No splatter caused by distortion of peaks occurs as long as we do not try to exceed the limits while using this set of amplifier conditions. This holds true in all the following pictures regardless of the type of signal input.

Fig. 2 shows the amplifier being driven into distortion on the two-tone signal. The peak linear-

Fig. 1 — The "two-tone" linearity test signal which was used to adjust the amplifier for low distortion over all parts of the waveshape. At this time, notice only one thing: the top of the pattern remains "unflattened" or "unsquashed." It extends exactly from one horizontal line on the oscillogram to the other. These lines represent the point of peak linearity capability of the amplifier. No splatter caused by "limiting" of peaks can occur as long as we do not try to drive any type of signal past the amplitude point represented by the lines. This holds true in all of the pictures.

Fig. 2 — The amplifier driven into heavy distortion on the same test signal. The linearity capability has been exceeded. Note the "squashing" of peaks. Now compare the meter reading to that of Fig. 1. The meter shows what we all like to see — more power input; but the 'scope indicates this is distorted power.

Fig. 3 — The result of inserting a steady audio tone into a s.s.b. exciter. It may not look like sine-wave radio, but that is because we no longer have an audio signal. The exciter converted the single tone audio into single frequency r.f., the same as an unmodulated carrier. (The slight ripple represents imperfect sideband and carrier suppression and harmonic audio distortion.) Look at the meter! On steady signal the amplifier has no time to rest. It works regularly — not in spurts — as on voice. The meter has a chance to indicate maximum signal input.

Fig. 4 — Actual voice waveshapes. A sustained note was used for clarity of presentation. Notice that the high-amplitude low-energy peaks which are encountered in the voice just reach the lines representing maximum permissible amplitude. Look at the meter. Oh, how sad! That is the current we must use to figure power input.

Fig. 5 — The audio gain increased to give a more satisfying meter reading. Yes, the meter reads more, but look at the 'scope. Those peaks are really flattening. Splatter! Zounds! No escape! A clean signal dictates low meter reading, while greater deflection causes trouble.

Fig. 6 — Another voice sound, purposely altered by audio compression to increase the "average-to-peak" ratio. Notice that the meter again shows an increase over the conditions of Fig. 4. This is also due to "flattening" of the waveshape. Distortion of the audio signal is again present, as it was in Fig. 5, but no splatter is transmitted if the resulting new frequencies are carefully filtered out early in the exciter. New frequencies, caused by r.f. amplifier flattening, cannot be removed. They will be transmitted to plague adjoining channels.

ity capability has been exceeded. Note the flattening of the peaks. Now notice the meter reading as compared to Fig. 1. The meter shows what we all like to see — more power — but the 'scope indicates that it is distorted power.

Fig. 3 shows the result of introducing a single audio tone into the speech amplifier. It may not look like sine-wave audio, but this is because we no longer have an audio signal. The s.s.b. exciter converted the single tone audio into single frequency r.f. — practically the same as an unmodulated carrier. Look at the plate meter! On steady signal the amplifier has no time to rest. It works regularly — not in spurts as on voice. The meter has a chance to indicate full maximum signal input.

Fig. 4 shows an actual voice waveshape. The sound used was a sustained "O-o-o-h-h-h." Notice that the "peaks" just reach the limit lines. Look at the meter. Oh, how sad! That's the current we must use to calculate power input!

Fig. 5 is the condition where the audio "gain" is increased to correct the low meter reading. Yes, the meter reads more, but take a look at the 'scope. Those peaks are really flattening. Splatter! Zounds! No escape! A clean signal means lower meter reading, while greater deflection causes trouble.

Fig. 6 shows the same voice sound, purposely altered by audio compression, to increase the "average-to-peak" ratio. Notice that the meter again shows an increase over the conditions of Fig. 4. This is also due to the flattening of the waveshape. Distortion of the audio is present, but no splatter results if the new frequencies are carefully filtered out early in the exciter. New frequencies resulting from r.f. linear amplifier flattening cannot be filtered out. They will be transmitted to plague adjoining channels.

Study of the photographs reveals that there is, as previously mentioned, lack of connection between d.c. meter readings and the type and quality of actual amplifier output.

The situation looks rather gloomy, doesn't it? Is it possible for an average amateur to operate a linear amplifier properly without access to laboratory measuring techniques? Well, the best answer I can give is that hundreds are doing it every day. Perhaps the meters don't give all the necessary indication, but never underestimate the flexibility of an amateur. The trial-and-error system can do wonders.

Splatter

A chain of two or more linear amplifiers, upon construction, is hardly ever able to develop maximum rated output without considerable adjustment. Luckily, s.s.b. transmitting and receiving techniques have the valuable property of making nonlinear amplifier distortion and splatter stick out like a sore thumb. While the same amount of distortion would be partly hidden by the voice sidebands of a double sideband signal and be somewhat obscured by lack of selectivity in an ordinary receiver, such is not the case on s.s.b. There is no such thing as distortion splatter which

appears on only one side of the carrier frequency.

A s.s.b. receiver has an opportunity to view, generally unhindered by readable signal from the s.s.b. exciter, the amplitude, nature and frequency spread of nonlinear amplifier splatter appearing on the unwanted sideband. This situation makes possible accurate and worthwhile on the air reports of amplifier performance. In cases of "peak limiting" distortion, one can simply turn down the gain until the person at the receiving end reports a clean "unwanted" sideband. Changes can then be made to try and allow more power without degrading the signal.

Power Input

Now what about power input? Ask a s.s.b. operator exactly how much power he is running. The answer might sound something like, "Well, the plate voltage is 2000 and the meter kicks up to about 200 mills on voice peaks. That's about 400 watts. Of course, that's only meter reading. Actually, the peak power is a lot more than that."

Now really pin him down. Ask him what his "peak" power really is. For that matter, what does he mean by "peak power"? Chances are, his eyes might take on a rather furtive look. He might mention something about multiplying the meter reading by the factor 1.57. Don't press him too far. You might become as confused as he is.



Actually, the power-input situation is not nearly as complicated as it is confused. The indiscriminate use of the word "peak" to describe three distinctly different conditions is detrimental to the clarity of the otherwise fairly simple matter of power-input considerations.

The three uses of "peak," as heard on the air and seen in print, are "instantaneous peak power," "peak envelope power," and "meter peak, on voice, power." Unfortunately, it has seemed fashionable to omit the qualifying terms and call any one of them "peak power." When this happens, even a person who understands the situation perfectly must determine which yardstick is being used before giving intelligent consideration to the particular situation involved.

There are two ways which I could use to explain the different kinds of "peak power." One would be to draw a rather involved illustration of a modulated r.f. signal, showing both individual r.f. cycles and cycles of modulating voltage. The other, which I shall try, is to explain the same effects in a non-radio example which closely parallels the case of modulated r.f. energy.

Our example is to be a "four-way" reading lamp, one that plugs into the 110-volt a.c. socket and allows the user to select various conditions of brightness. One setting is "off" — the others

"I COULD DRAW A RATHER INVOLVED ILLUSTRATION OF A MODULATED RF SIGNAL"



range from "dim" to full intensity of the 100-watt bulb. Now let's imagine that this light bulb represents the r.f. output signal of a s.s.b. transmitter, not in the usual sense of a "dummy load," but with the more abstract view that each cycle of 60-cycle a.c. current represents a similar cycle of high-frequency energy in the r.f. signal. Thus the lamp, burning steadily at full brilliance, represents a s.s.b. amplifier with full "inserted carrier" of 100 watts. Now, still in the abstract vein, the brightness control switch of the four-way lamp will be used to represent modulation. The switch is made to vary the brilliance of the lamp at a fairly slow and sporadic rate from one intensity to another. This simulates voice modulation. The remaining item in our flight of fancy is something to represent the plate milliammeter in the transmitter. Let's say that we connect an a.c. ammeter, with a very sluggish movement, in series with the a.c. cord to the lamp. This simulates the inability of a plate meter accurately to follow voice modulation. We are now ready to demonstrate the meaning of "instantaneous peak," "peak envelope or maximum signal," and "meter peak, on voice" power.

To find "instantaneous peak power," we turn our 100-watt light to full brilliance. For simplicity, let's say that the r.m.s. voltage is 100 instead of 110. Ohms Law says that the r.m.s. current is 1 ampere. Consider only one cycle of the 60-cycle wave. The "crest or instantaneous peak" voltage in this cycle is 1.41 times 100 volts. This is 141 volts. The current at "peak" is 1.41 amperes. If $P = IE$, the concept of "instantaneous peak power" says that 200 watts of power exist for an infinitely small period of time at the crest of the cycle. What does this mean from the point of view of a man reading a book? Nothing! He's got a lamp that gives a hundred watts of illumination and he knows it. The same holds true in a radio transmitter. "Instantaneous peak power" has very little value in everyday operation and adjustment.

Now to the heart of the matter — "peak envelope power" or "maximum signal power." This is possibly the most useful of our terms. It is the way tube manufacturers rate their product. More often than not, it is meant when one sees "peak" mentioned in print. What is the value in the case of our light bulb example? — 100 watts; it's as simple as that! Just a minute! How can the 100 watts be "peak power" and still be the value determined by multiplying average r.m.s. voltage times r.m.s. current (100 volts times 1 ampere)? This certainly gives "average" and not "peak" power. In this case, the word "peak" no longer

refers to the crest of the 60-cycle wave. To show what is meant, we no longer run the lamp at full power, but simulate modulation by varying the average power all the way from zero to maximum. Now the light bulb (or amplifier) doesn't work fully all the time. It has comparative periods of rest because the signal is pulsating at a sporadic rate. In this case "peak" refers to the fact that the full 100 watts average power only exists for a relatively short period of time. So short, in fact, that the sluggish a.c. meter in the line would never have a chance to indicate an amount of average power approaching the 100 watts we know briefly exists.

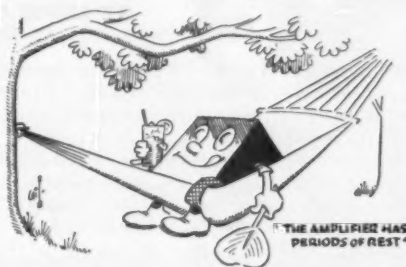
The obvious solution to determining "maximum 'average' signal power" is to switch the lamp to full brilliance and leave it there while the meters catch up. The same holds true with a s.s.b. transmitter. Never measure "peak envelope or maximum signal power" under voice conditions. Insert carrier or whistle into the microphone and the meters will accurately record this kind of "peak" power. From a strictly r.f. point of view, we are still dealing with "average power" values. These should be familiar to all of us.

"Meter peak, on voice, power" is fairly self-explanatory. I have said that the a.c. meter in our lamp cord was far too sluggish to follow even the relatively slow variations of power which represented modulation. It has already been explained why power figures derived from fluctuating d.c. meters are nearly useless as an indication of amplifier performance unless correlated with other measurements. I mention this type of power again only to show the need for learning what kind of "peak power" is being used whenever the subject arises in a discussion of linear amplifiers.

Perhaps unfortunately, from one point of view, the regulations require that s.s.b. transmitter power be determined from meter swings on voice. This has the effect of keeping the pressure on an amateur to achieve more meter swing. That's fine, if it isn't done at the expense of linearity. This measuring system leads to an interesting situation. If one has an amplifier that "talks up" to a kilowatt, he wouldn't be able to whistle into the microphone without exceeding the legal limit. However, the "maximum signal power" would be the same in both cases.

Earlier I mentioned the figure 1.57 in connection with "peak" power. Never use it unless you are dealing with "two-tone" tests. What is a "two-tone" test? Just because a s.s.b. exciter is generally used as a source of signal for this linearity test doesn't mean that it is a complicated situation. Actually, two ordinary r.f. oscillators, separated in frequency by several hundred cycles and simultaneously feeding equal signals into a linear amplifier chain, would work equally well. I won't go into the reason why two steady frequencies, rather than one, are used to show distortion. However, one thing may seem strange. The average amplifier power, as read by the meter, is much less with two signals than it is with one. Due to the combination of the signals, the amplifier no longer works all the time. It has

periods of rest. The "maximum signal power" remains at full value, but the "average-reading" meter indicates far less current. If the amplifier is Class B, the meter now only reads about 64 per cent of its value for one signal of the same maximum amplitude. The reciprocal of .64 is 1.57. Thus the meter reads 1.57 times as much on a



single signal (such as carrier) as it does on a "two-tone" test. This factor only applies to Class B operation. Class AB₂ and Class AB₁ have respectively lower ratios of difference in meter readings between signals of one and two frequencies. Continuing in the same direction, Class A entails a ratio of unity because there can be no change of plate current, regardless of the type or number of signals.

From the above, one can see that the figure 1.57 should only be used in one specialized case, never when referring to voice deflection of a meter. A person can't look at a dancing plate meter and accurately see that his "maximum signal or peak envelope power" is a certain given amount. As a final check to prove that the factor 1.57 actually works out in practice, refer back to the photographs and compare the currents in Figs. 1 and 3.

Adjustment Without a 'Scope

This isn't basically an article on linear-amplifier adjustment, but I am going to give an example to demonstrate the proper use of d.c. meters when nothing better is available. The procedure falls into the "cheap and dirty, but rather effective" class.

Before I proceed I point out that throughout this article I have mentioned only the "final amplifier." Actually, flattening and distortion may occur in any driver stage. I do not think it necessary, for our purposes, to stress meter readings and waveshapes for other stages. The indications occurring at the output of the final accurately reflect the condition of earlier stages. Of course, in actual practice it is necessary to locate and work on the weak link.

Let's say that I have an amplifier whose specs call for a plate voltage of 1500 and maximum signal current of 300 ma. (Remember, the manufacturer means on a single steady signal, not voice.) First, I insert some carrier from the exciter. I tune the grid and plate circuits to resonance as indicated by an output indicator. (Any type of output indicator connected to the feedline

(Continued on page 116)

One Tube—80 and 40 Meters—75 Watts

Using the 6146 as a Crystal Oscillator

BY LEWIS G. McCOY, WHICP

YES, the title is correct. This article describes a one-tube, two-band, crystal-controlled oscillator capable of running approximately 75 watts input. By utilizing a single tube as a high-power oscillator, the circuitry, wiring, and construction are kept as simple as possible. In addition, by making use of the "economy" power supply,¹ watts-per-dollar is held at a maximum. Another feature of the rig is that when the Novice graduates to the General Class ranks, the components can all be used in an all-band rig.

Circuit Details

The "economy" power supply uses an ordinary replacement-type transformer in a bridge circuit. As can be seen from the circuit diagram, Fig 1, the transformer rating is 350 volts each side of center tap, but the output voltage obtained is approximately 500. The supply will deliver 500 volts at 140 ma., which is adequate for the one-tube transmitter. For tune-up purposes, the output of the power supply can be switched from high to low voltage. The low potential output is 280 volts.

In order to limit the input to 75 watts, the screen voltage is held to 125 volts by R_1R_2 . With the supply output switched to low voltage, the screen drops to 80 volts, convenient for tune-up purposes.

The crystal current is monitored by a 2-volt 60-ma. bulb connected between the crystal and chassis ground. The bulb also serves as a fuse, in the event the crystal current should accidentally rise above a safe value.

To avoid coil changing, a portion of the plate

¹Grammer, "More Effective Utilization of the Small Power Transformer," *QST*, Nov., 1952.

• If this transmitter doesn't become a very popular design for a "first transmitter" we're going to change fortune-tellers. It has all the desirable features a Novice transmitter can have: full power, maximum watts-per-dollar, and ease of construction and operation. In fact, for any kind of crystal-controlled operation on 80 or 40 at the 75-watt level, it is mighty hard to beat. At catalog prices the cost is less than \$35, and a little judicious shopping and swapping can bring the price down still more.

coil is shorted out when 40-meter operation is desired.

Construction

The transmitter is built on an 11 × 7 × 3-inch aluminum chassis and the 6146 and r.f. components above deck are shielded by a 6 × 6 × 6-inch aluminum box. If one lives in an area where there is no danger of TVI, the tube and other parts above chassis could be left unshielded. The controls could be mounted on a panel. However, because TVI must be considered, the construction shown here takes care of the bugaboo.

The transformer and rectifiers are mounted on the chassis top at one end. The other power supply components; T_1 , L_4 , the 8- μ f. electrolytic capacitors and the 20,000-ohm 10-watt resistors, are mounted below deck.

The 6146 socket is mounted 1½ inches in from the front of the chassis and 4½ inches from the end. Two 1-inch isolantite standoffs are used to support L_2L_3 , and they are mounted 2¼ inches apart. The rear one is 2½ inches from the chassis back and 2 inches from the side.

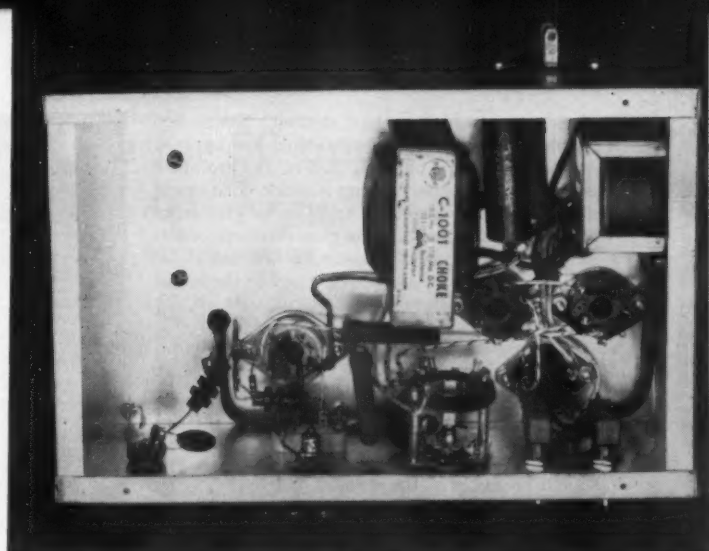
A row of ¼-inch holes is drilled near the bottom on both sides of the cover box to permit



Pictured is the completed 6146 rig. The plate-current indicator lamp is to the left of the tuning knob. In areas where TVI is likely to be a problem, a metal bottom plate should be used in addition to 6 × 6 aluminum box shown.

QST for

Bottom view of the one-tube transmitter. The 6.3-volt filament transformer is mounted on the side of the chassis at the upper right-hand corner. To the left of the transformer is one of the 8- μ f. electrolytics; the other electrolytic is not visible, being mounted behind the power-supply choke coil.



ventilation of the compartment. Several $\frac{1}{4}$ -inch holes are also made in the box top directly over the 6146.

Wiring

The power supply is wired first. The center taps of T_1 and the high-voltage winding of T_2 are connected together and soldered to the low-voltage terminal of S_3 . A lead is connected from

one of the 5Y3 filament terminals to the high-voltage terminal on S_3 . One lead from L_4 is connected to the arm of S_3 . Many Novices may wonder why the two 8- μ f. electrolytic capacitors are connected in series. This is to double the working voltage of the filter.

Next, the below-chassis portion wiring of the r.f. section is completed. The oscillator will work with less capacity for C_1 but the crystal current is

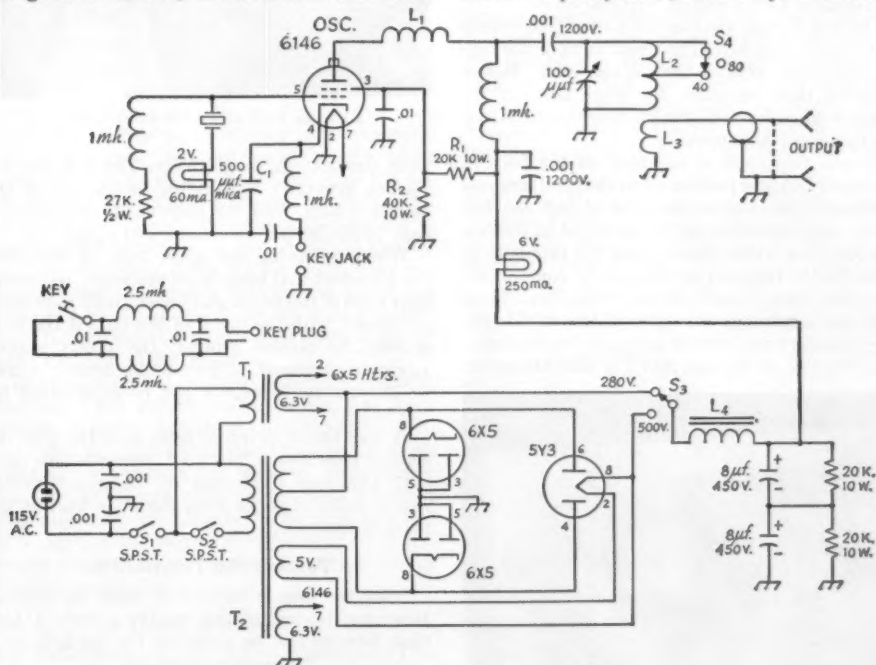


Fig. 1 — Circuit diagram of the 6146 oscillator.

L_1 — 1.8 μ h. (Ohmite Z-144) choke.

L_2, L_3 — See text and photograph.

L_4 — 10.5 henrys, 110 ma., 225 ohms.

S_3 — 1-pole 6-position (2 used) wafer switch, non-shorting (Centralab 1401).

S_4 — 1-pole 6-position (2 used) statite wafer switch, nonshorting (Centralab 2501).

T_1 — Filament transformer, 6.3 volt, 1.2 amp.

T_2 — Power transformer, 360-0-360 volts, 120 ma., 6.3 volts 3.5 amp., 5 volts 3 amp. (Stancor PC8410).

Unless otherwise specified, all capacitor values are given in microfarads. Fixed capacitors except 8- μ f. electrolytics and C_1 are disc ceramic.

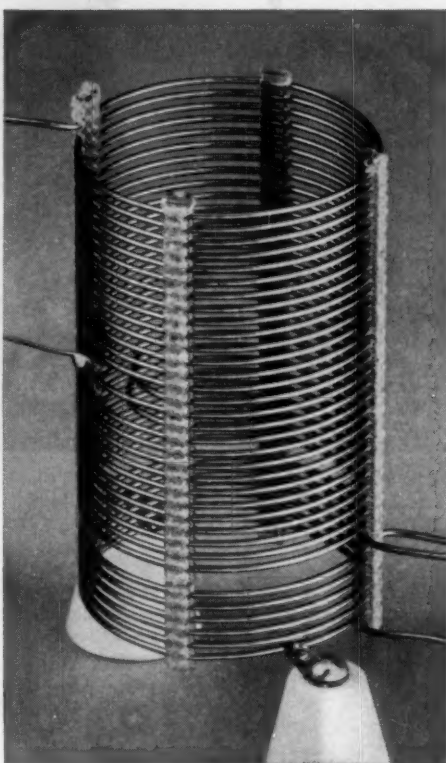
likely to run higher than desired. No socket should be used for the 2-volt 60-ma. dial lamp in series with the crystal. A $\frac{5}{8}$ -inch rubber grommet is used to hold the dial lamp in place. The inside diameter of the grommet is $\frac{3}{8}$ inch, just large enough to accommodate the glass envelope of the lamp. Connections are made to the lamp by soldering leads to the base point and to the metal shell. The lead from the shell connects to the chassis.

Standard coil stock (B & W 3900, 2-inch diam., 8 turns per inch, No. 14 wire) is used for L_2L_3 . A total of 38 turns is cut from the original stock. At one end of the piece, a single turn is unwound from the support bars. From this end, count up $7\frac{1}{2}$ turns and cut the seventh turn. The cut should be made at the support bar opposite the bar from which the first lead extends. The leads from the cut point are separated from the side support bars and brought around to the same bar as the first lead. At the other end of the coil, which will be the top, a lead is unwound from the support bars and extends from the bar opposite the one with the three leads. This coil is shown in one of the photographs.

Counting from the top, the 15th and 17th turns are bent in, allowing access to the 16th turn. This is for the 40-meter tap. A four-inch length of wire can be soldered to this point. The other end will connect to the switch terminal on S_4 .

The coil is supported on the isolantite standoffs by two soldering lugs. The small ends of the lugs are first bent around the bottom turn. Before soldering them in place, the large holes in the lugs should be located over the holes in the standoffs for proper alignment.

A coax receptacle is mounted on the back of the shield box and positioned so that the terminal is opposite the ungrounded end of link L_3 . The switch and capacitor can be mounted in the box first and then wired. However, it will probably be easier for the beginner to wire all the components first, and then mount them in the box. Three holes are needed in the front of the shield box. The capacitor and switch holes are $1\frac{1}{2}$ inches in from the side of the box and $2\frac{1}{4}$ and $4\frac{1}{2}$ inches



Close-up view of the coil construction.

from the bottom, respectively. The hole for the $\frac{5}{8}$ -inch grommet is 2 inches to the left of the capacitor hole. With the holes cut in the box, it is easy to fit the box over the wired parts.

When mounting the glass bulb of the plate circuit 6-volt dial lamp in its grommet, be careful that none of the metal parts of the bulb base come in contact with the metal of the box. If the bulb shorted to chassis ground, the power supply might be damaged. If the builder desires, a 200- or 250-ma. milliammeter can be substituted for the bulb.

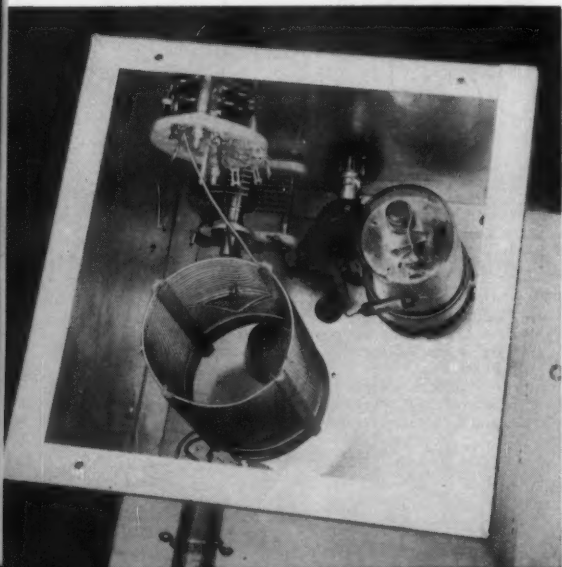
It was found in initial tests with the unit described here that a bad v.h.f. parasitic was present. This was eliminated by using an Ohmite Z-144 choke in series with the plate lead at the plate of the tube.

Testing the Transmitter

After the unit is wired it is ready for testing. However, before turning on the power, a key-click filter should be made up for the key. It is

(Continued on page 118)

Looking down into the oscillator compartment. Details on constructing and mounting the coil are given in the text and another photograph.



QST for

Portable Antennas for 50 and 144 Mc.

Come-Apart Arrays for Use Away from the Home Station

BY EDWARD P. TILTON, WHDQ

• Mobile operation on 6 or 2 is great stuff, but if you like to work from the mountain tops, or in other choice v.h.f. spots, you'll soon come to the conclusion that you need something better in the way of an antenna system than a vertical whip. Here are portable beams for 50 and 144 Mc. that can be packed in the back of your car and still leave room for the lunch. They can be put up in your favorite location in a matter of minutes.

EVEN if you live at the busiest intersection or in the lowest spot in town, you can still have fun on the v.h.f. bands. Pack up your gear and antennas and head for the wide open spaces. Our spring and fall V.H.F. QSO Parties and the Annual ARRL Field Day provide week ends of concentrated v.h.f. operating, and a family picnic at any other time can be combined with an expedition to some choice v.h.f. spot.

This calls for antennas that can be erected and dismantled easily. The arrays for 50 and 144 Mc. shown here can be stowed in the back of almost any car, even with only partial dismantling. The quick method leaves the 2-meter antenna assembled, and merely involves removing extensions from the 6-meter elements. In this form the antennas and supporting mast can be assembled, ready for use in your favorite v.h.f. location in less than five minutes. If you require a smaller package, removing a few screws and folding the 2-meter elements permits packing the works in a space five feet long and about six inches square. From this stage to on-the-air might take a matter of 10 minutes, at the most.

The beams are not intended to be world-beaters. The real v.h.f. expedition enthusiast will want something better, but these antennas do surprisingly well in a good location. The 6-meter array has a driven element and director, both 3-piece elements. The 2-meter job is a cut-down TV array originally made for Channel 6. Its elements fold back against the boom, if necessary. Both antennas use gamma-match feed for either 52- or 75-ohm coaxial line.

A Quick-Up Support

A convenient support can be made from 1½-inch aluminum TV masting. Two 10-foot lengths were purchased and cut in half. One 5-foot piece was cut for the 6-meter boom and the other three are our mast. The bottom section is fastened to the door handle with a sheet aluminum clamp similar to those described for assembling all-metal v.h.f. arrays shown in all recent editions of

the *Handbook*. No dimensions are given here, as requirements are likely to be different for other makes of cars. A sample clamp can be made of stiff paper or from flashing copper, and this used as a template for making the real thing out of 3/32-inch sheet aluminum.

In the photograph only two mast sections are shown in use, but in many locations the full 15 feet may be desirable, particularly if there are low obstructions in the immediate vicinity of the car. Checks in wide-open spots have shown that there is not a great difference between the 10- and 15-foot heights otherwise. There is more variation in driven-element impedance at the lower height as the antenna is rotated, but performance is not seriously affected.

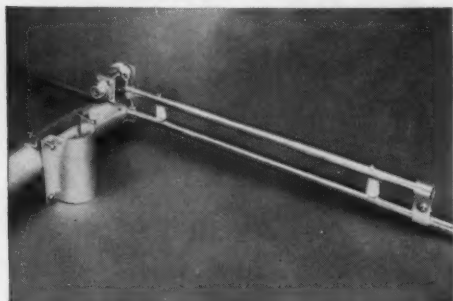
To provide a stable support without guying, the bottom of the mast must be anchored thoroughly. We usually run an old screwdriver into the ground and slip the mast over it. If the car is parked on a hard surface, the mast can be held firm by placing some large rocks around the base.

A helpful feature, added to the mast after the photograph was made, is a ¼-inch bolt 6 inches long, run through the second mast section. A piece of the half-inch element stock 4 ¼ inches long is slipped over the bolt when it is inserted, leaving a quarter inch for tightening the nut on



The portable 6- and 2-meter arrays ready for use. They are shown here on a 10-foot support, but another 5-foot section can be added without need for guying.

the other side of the tubing. The telescoping portions of the masting are 6 inches long. If this bolt is run through the outer tubing exactly 6 inches from the end it will provide a bearing for supporting the weight of the antenna, as well as serving as a turning handle and direction indicator. The



Close-up view of the matching device on the 50-Mc. driven element. The series capacitor and the coaxial fitting are mounted on a small U-shaped bracket. If the elements are to be removed from the boom for carrying, the screw and nut holding the connection to the matching section can be removed. The mounting clamps must also be removed from the center section of each element in this case. Ordinarily, the boom and two center sections are left assembled for carrying in the car.

latter assumes that the bolt is lined up with the booms of the antennas. The "direction indicator" is no gag. Looking up at the beam elements after dark is likely to be rather confusing.

Beam Details

The 6-meter array was held to two elements for light weight and compact design. Even this simple antenna will be a great improvement over anything in the way of a strictly mobile set-up. Hilltop checks with horizontally polarized fixed stations indicate an average gain of 25 to 30 db. over the quarter-wave whip normally used for mobile work. If the fixed stations were vertically polarized the story would be quite different, but as practically all 6-meter work is done with horizontal beams today, the portable array enjoys a tremendous advantage over a vertical whip.

Construction follows the all-metal technique outlined in the v.h.f. antenna chapter of all recent editions of the *Handbook*. The boom, made from the leftover piece of masting, is 36 inches long. The director and driven element are 34 inches apart. They pass through the boom and are held in place by semicircular clamps of sheet aluminum. There must be solid contact between the boom and elements, otherwise reception will be noisy when the elements flutter in the wind.

We used half-inch dural tubing, but the size is not critical. Anything up to one inch can be run through 1½-inch tubing. The center sections of both elements are 36½ inches long. Two more 36½-inch sections are added to the driven element, while the director extensions are 34 inches. An alternative method would be to make the center section of the director 31½ inches long, in which case the extensions would all be the same length and interchangeable.

Inserts about four inches long, for taking the extensions, were turned down from aluminum rod. If a lathe is not available for this work, the extensions can be attached by the sleeve method outlined in all recent *Handbooks*. Pieces of the element tubing about 6 inches long are sawed lengthwise, taking out enough of the material so that the remainder can be compressed to make a tight fit inside the tubing. These are inserted into both ends of the center sections to a depth of three inches, leaving three-inch exposed portions onto which the extensions are slipped. The abrasive nature of aluminum tends to make the parts hold together tightly enough for the purpose, without fastenings, even after considerable use. The writer has used the compressed-sleeve method in portable antennas for years, and found it quite adequate for the purpose. It is most satisfactory with elements of ¾-inch or larger diameters, when the beam is for 50 Mc. or lower frequencies. Smaller diameters and thin-wall tubing are satisfactory for 144 Mc. or higher.

The 6-meter boom is held to the support by the familiar aluminum clamp. Again, as tubing sizes may vary, no dimensions are given. Suitable dimensions are arrived at most readily by the template method already outlined. The clamp assembly is held together with No. 8 machine screws, the ends of which were swaged in a vise after the nuts were run on part way. Two of the four screws required for the door-handle clamp can be swaged in this way, also, leaving only two nuts that must be removed in taking the assembly apart for ordinary carrying. If the arrays are to be completely dismantled, removal of six more screws will do the job.

The simplest way to make a 2-meter antenna is to cut down a Channel 6 TV Yagi. The one we used was originally a 5-element job having a folded-dipole radiator. The boom was too long to fit in the back of our car, so it was cut down to a 4-element antenna. The spare director element was then made into a gamma-matched dipole, which was installed in place of the folded dipole originally used for the driven element. Many TV Yagis are supplied with elements that fold back against the boom, a mechanical arrangement that is ideal for portable use. Spacing of the elements is not particularly critical. The Channel 6 spacings may be used for 144 Mc., also, though the array can be revamped to *Handbook* dimensions if you like.

Element lengths were cut to *Handbook* dimensions. As has been done many times before, we experimented a bit with adjustable elements and came to the conclusion that there was little to be gained from attempting to tune up the system, except for the matching adjustments, which will be detailed later. The length of the driven element in inches is found by dividing the number 5540 by the frequency in megacycles. The reflector is 5 per cent longer, the first director 5 per cent shorter, and the forward director 6 per cent shorter than the driven element. This applies to both the 50- and 144-Mc. arrays. Final dimensions we used were as follows: Driven element —

38 inches; reflector — 40 inches; first director — 36 inches; forward director — $35\frac{3}{4}$ inches. This gives fairly uniform performance from 144 to 146 Mc. Both gain and front-to-back ratio fall off slightly, but not seriously, above the middle of the band.

Adjustment

Details of the gamma matching systems are shown in close-up photographs. A section of tubing or rod similar in size to the driven element is mounted on one side of the element and parallel to it with small cone stand-off insulators. An adjustable aluminum clamp makes contact between the matching section and the main element, the point of connection being moved until the best possible impedance match is achieved. A series tuning capacitor is connected between the matching section and the inner conductor of the coaxial line, to tune out the reactance of the matching section.

The gamma section is 12 inches long on the 50-Mc. array and 6 inches on the 144-Mc. one. A series capacitor of 50 $\mu\text{f.}$ will do for either array. The spacing of the capacitor may be small, as the r.f. voltage is very low at this point. Even the smallest available capacitor, the Hammarlund type MAPC-50, is suitable for the low power generally used in portable work. If you're worried about the effects of moisture, a piece of plastic film may be wrapped around the tuning capacitors when the arrays are used in rainy weather.

There is only one way to adjust a matching system and be sure that you're doing it properly, and that is with a standing-wave bridge. The point of connection between the gamma section and the driven element should be set at about 4 inches for the 2-meter antenna or 10 inches for the 6-meter one. The series trimmer capacitor is then adjusted for minimum reflected power. If the indication will not drop to zero or very close to it, try moving the connecting clip, retuning the series capacitor for each new setting of the clip. Be sure that the clip is making a clean tight contact on each test position, or it will be impossible to obtain a good match. Good contact in the coaxial cable connectors is also extremely important. We had plenty of trouble in the initial stages of the project as the result of the outer conductor of our coax making poor contact to the connector sleeve.

A rough approximation of the correct setting can be made by adjusting the gamma match and series capacitor for maximum field-strength indication, but the field-strength meter method is the hard way. The lowest possible s.w.r. may not be too important, with the short run of coax used in a portable setup ordinarily, but the bridge method is so simple and exact that it should be used wherever possible.

Some Random Ideas

Portable antenna design is a fruitful field for the gadgeteer, and there are countless ways the job can be done. Perhaps you want to use the

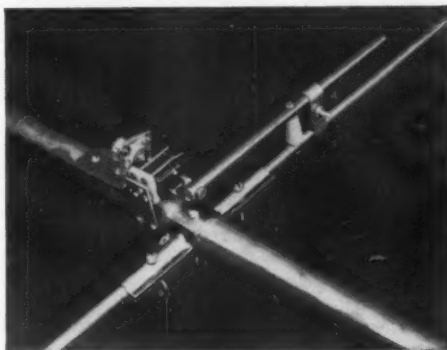
folded-dipole feed system that came on the TV antenna originally. All right, just use a coaxial balun and 72-ohm coaxial line. If the TV antenna was designed for 300-ohm feed, the balun will give you a good match.

Maybe you'd like to stack two antennas for 144 Mc. In that case, if each array has folded-dipole feed designed for 300-ohm line, space the two arrays 80 inches apart and feed through a balun at the midpoint of the open-wire phasing line. The balun and transmission line should be of 50-ohm coax in this case. This will not provide a perfect match, but it will be close enough for the purpose. If you want a better match, connect a shorted quarter-wave stub at the feed point and then slide the balun up on this stub for lowest s.w.r.

For more gain on 50 Mc., add more elements, following *Handbook* dimensions for element lengths and spacings. The gamma match arrangement will work well with any number of elements.

Your car bulges below the door handles? There are many other ways to anchor the support. WIDXE and WIVLH use their bumper jack, tying the vertical support to the jack with webbing straps. This puts rotation of the array out of reach of car occupants, but it has the advantage of leaving all doors free.

You want to work 10 meters too? The 6-meter driven element can be made into a 10-meter di-



Details of the 2-meter gamma match. The series capacitor is mounted at right angles to the boom in this case, as adjustment is done from the side of the array instead of the end. Elements can be folded back against the boom if the array must be packed away in a small space.

pole by a little revision of the length of the center sections, so that all four extensions can be plugged together to make a dipole 16 feet long. Make the gamma section longer, in this case, to permit adjustment for 28 Mc.

Or take any of these ideas and add some more of your own. The point is that operating v.h.f. gear away from your home location in some high clear spot far from city noises is lots of fun. If you have a top-notch home-station setup, the chances are that you'll never work as far with the portable gear as you can from home, but there's something about portable operation that gets into one's blood, even so. Try it, and see!

The Automobile Storage Battery and Its Charging System

Principles and Limitations of Car Power Plants

BY DONALD MIX, WITS

• The success of any mobile installation depends to a large extent upon intelligent use and maintenance of the car's storage battery and charging system. Included in this article is a discussion of the principles of charging-regulator circuits.

ELECTRICAL power for motor cranking and for operating lights and accessories in a car when the motor is idle is furnished by a storage battery. Unlike a dry battery, which must be replaced when it is discharged, the storage battery may be recharged hundreds of times before its useful life is ended. The charging is done automatically when the engine is running by means of a generator belt-driven from the crankshaft of the motor.

The storage battery is made up of units consisting of a pair of coated lead plates immersed in a solution of sulphuric acid and water. The basic unit delivers a nominal voltage of 2. The number of watt-hours (watts \times hours) that may be drawn from the battery before recharging is necessary is increased by enlarging the plate area and by connecting units in parallel. Such an assembly is called a cell. Cells, each of which delivers about 2 volts, can be connected in series to obtain the desired battery voltage. A 6-volt battery therefore has three cells, and a 12-volt battery has 6 cells. The average stock car battery has a rated capacity of 600 to 800 watt-hours, regardless of whether it is a 6-volt or 12-volt battery. Special heavy-duty batteries with larger capacities are available.

Specific Gravity and the Hydrometer

The electrical power delivered by a storage battery is a result of chemical action between the sulphuric acid in the solution (electrolyte) and the lead plates. As power is drawn from the battery, the acid content of the electrolyte is reduced. The acid content is restored to the electrolyte (meaning that the battery is recharged) by passing a current through the battery in a direction opposite to the direction of the discharge current. The positive terminal of the charger is connected to the positive terminal of the battery. The positive terminal of the battery is usually identified by a + mark and is of slightly greater diameter than the negative terminal.

Since the acid content of the electrolyte varies with the charge and discharge of the battery, it is

possible to determine the state of charge by measuring the specific gravity of the electrolyte. Specific gravity is the ratio of the weight of a unit volume of electrolyte to the weight of an equal volume of water.

An inexpensive device for checking the s.g. is the hydrometer which can be obtained at any automobile supply store. The hydrometer consists of a calibrated glass float within an outer glass tube that is fitted at one end with a rubber suction bulb, and with a rubber nozzle at the other. Each cell of the battery has a removable cap giving access to the electrolyte. In checking the s.g., enough electrolyte is drawn out of the cell and into the hydrometer so that the calibrated bulb floats freely without leaning against the wall of the glass tube. The hydrometer should be held in a vertical position at eye level and a reading taken at the surface level of the electrolyte.

Care should be taken in using the hydrometer because the acid is harmful to the skin and clothing as well as to battery terminals and metal parts of the car. The electrolyte should be returned to the cell after testing. Each cell should be tested in turn.



While the readings will vary slightly with batteries of different manufacture, a reading of 1.275 should indicate full charge or nearly full charge, while a reading below 1.150 should indicate a battery that is close to the discharge point. More specific values can be obtained from the car or battery dealer.

These readings are normal for an electrolyte temperature of 80 degrees F. For extremes of temperature, 0.004 should be added to the reading for each 10 degrees of temperature above 80 degrees above 80, or subtracted for each 10 degrees below 80 degrees. Some hydrometers have built-in thermometers that simultaneously check the temperature of the electrolyte. The

s.g. reading of all cells in a battery should be alike within 0.025.

Readings taken immediately after adding water, or shortly after a heavy discharge period will not be reliable, because the electrolyte will not be uniform throughout the cell. The battery

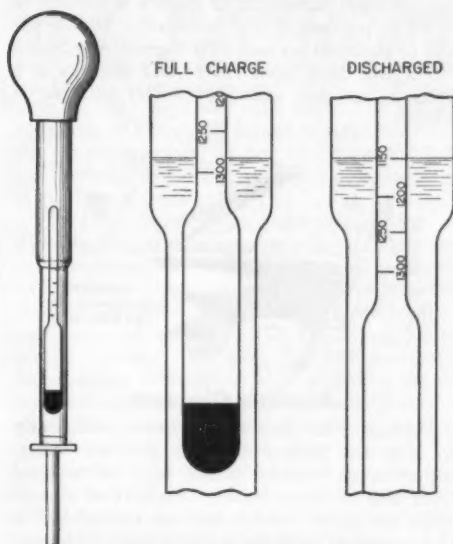


Fig. 1—Sketches of the hydrometer showing (A) the position of the calibrated float when the battery is near full charge, and (B) when the battery is almost completely discharged.

should be allowed to stand for several hours before taking the reading. Charging will speed up the equalizing, and some mixing can be done by using the hydrometer to withdraw and return some of the electrolyte to the cell several times.

A battery should not be left in a discharged condition for any appreciable length of time. This is especially important in low temperatures when there is danger of the electrolyte freezing and ruining the battery. A battery discharged to an s.g. of 1.100 will start to freeze at about 20 degrees F., at about 5 degrees when the s.g. is 1.150 and at 16 below when the s.g. is 1.200. There should be no danger of freezing if the s.g. is kept at 1.250 or higher.

If a battery has been run down to the point where it is nearly discharged, it can usually be fast-charged at a battery station. Fast-charging rates may be as high as 80 to 100 amperes for a 6-volt battery. Although a discharged or nearly discharged battery cannot be brought back to full charge by fast charging, it can be brought back to useful condition within a short time. Any 6-volt battery that will accept a charge of 75 amperes at 7.75 volts during the first 3 minutes of charging, or any 12-volt battery that will accept a charge of 40 to 45 amperes at 15.5 volts, may be safely fast-charged up to the point where the gassing becomes so excessive that electrolyte is lost or the temperature rises above 125 degrees. If the battery requires more than the above values of

voltage to produce the currents specified, fast-charging should be done with caution to avoid excessive heating.

A normal battery showing an s.g. of 1.150 or less may be fast-charged for 1 hour. One showing an s.g. of 1.150 to 1.175 may be fast-charged for 45 minutes. If the s.g. is 1.175 to 1.200, fast-charging should be limited to 30 minutes.

Care of the Battery

The battery terminals and mounting frame should be kept free from corrosion. Any corrosive accumulation may be removed by the use of water to which some household ammonia or baking soda has been added, and a stiff-bristle brush. Care should be taken to prevent any of the corrosive material from falling into the cells. Cell caps should be rinsed out in the same solution to keep the vent holes free from obstructing dirt.

All connections to the battery and along the battery line to the starter and transmitter should be inspected regularly for loose or corroded connections. Battery terminals and their cable clamps should be polished bright with a wire brush, and coated with mineral grease. Solid connections and adequate cable size in the battery circuit are of great importance. A 150-watt load on a 6-volt battery represents a load resistance of only $\frac{1}{4}$ ohm. If connection and lead resistances amount to as much as $\frac{1}{4}$ ohm, the power delivered to the load will be only one fourth of that delivered with zero loss resistance, and only half of the power actually drawn from the battery will be dissipated in leads and connections.

The hold-down clamps and the battery holder should also be checked occasionally to make sure that they are tight so that the battery will not be damaged by pounding when the car is in motion.

Voltage Checks

Although the readings of s.g. are quite reliable as a measure of the state of charge of a normal battery, the necessity for frequent use of the hydrometer is an inconvenience and will not always serve as a conclusive check on a defective battery. Cells may show normal or almost normal s.g. and yet have high internal resistance that ruins the usefulness of the battery under load.

When all cells show satisfactory s.g. readings and yet the battery output is low, service stations check each cell by an instrument that measures the voltage of each cell under a heavy load. No-load voltage measurements usually are meaningless because it requires a large current to detect the difference in internal resistance between a normal cell and one that is defective. Under a heavy load the cell voltages should not differ by more than 0.15 volt.

A load-voltage test can also be made by measuring the voltage of each cell while closing the starter switch with the ignition turned off. In many cars it is necessary to pull the central distributor wire out to prevent the motor starting.

If the battery is down so far that it will not turn the cranking motor, this voltage check can still be made. The average cell of a fully-charged battery on discharge while cranking should measure about 1.95 volts at 80 degrees, or 1.4 volts at 0 degrees. A defective cell will show up quite readily by a voltage reading noticeably below the readings of the other cells.

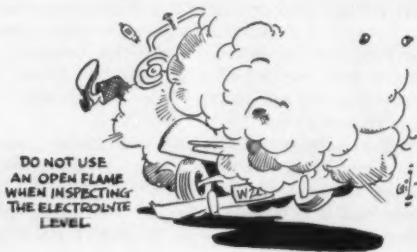
As the normal battery approaches discharge, its internal resistance increases so that the difference between no-load and loaded voltages becomes greater. A d.c. voltmeter with a scale of 10 for a 6-volt system, or 25 for a 12-volt system, mounted on the instrument panel and connected to the battery terminals, may be used to provide a continuous check on the condition of the battery. The most significant readings, of course, will be those made with the transmitter operating and with the car motor turned off. Experience will show the normal drop in battery-terminal voltage to be expected when the transmitter load is turned on. Voltage readings can be correlated with readings of specific gravity so that eventually the operator should be able to estimate the state of charge of the battery with only an occasional check with the hydrometer.

Electrolyte Level

Water is evaporated from the electrolyte, but the acid is not. Therefore water must be added to the solution in each cell from time to time so that the plates are always completely covered. Since the introduction of the charging regulator several years ago, the most frequent cause of subnormal battery life is failure to maintain proper electrolyte level. The level should be checked at least once per week, especially during hot weather and constant operation.

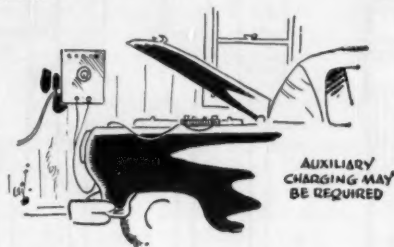
Distilled water is preferred for replenishing, but clear drinking water is an acceptable substitute. Too much water should not be added, since the gassing that accompanies charging may force electrolyte out through the vent holes in the caps of the cells onto the surface of the battery. The electrolyte expands with temperature. If a battery is replenished when the electrolyte is at 80 degrees, the level may fall off as much as $\frac{3}{16}$ inch when the temperature drops to 0 degrees. Conversely, if the electrolyte is replenished at 0 degrees, the cell may overflow at higher temperatures.

Do not use an open flame when inspecting the electrolyte level, since the chemical action develops hydrogen gas which is highly explosive.



Cranking Power

It requires about 65 per cent more power to crank a motor at 32 degrees than at 80 degrees, and about 250 per cent more at 0 degrees. At the same time, the cranking power delivered by a fully-charged battery at 32 degrees is reduced to about 65 per cent of that delivered at 80 degrees, and to about 40 per cent at 0 degrees. A cranking motor will draw from 125 to 300 amperes at 6 volts in summer and 300 to 700 amperes in winter.



Auxiliary Charging

Because a car may not be driven sufficiently to keep the battery charged, auxiliary charging from an external source may be required from time to time. Battery chargers of various types are on the market and can be installed in the garage so that the battery can be charged during the night. It is not necessary to remove the battery from the car. A battery is fully charged when the electrolyte shows no increase in s.g. over a 3-hour period.

Battery-Charging System

In the normal stock installation, the car battery is charged by a d.c. generator driven by a belt from the motor crankshaft. The output of the generator is governed by a regulator usually consisting of three relays.

The cutout relay is for the purpose of disconnecting the generator from the battery when the generator is not operating, to prevent the battery discharging through the generator windings. The contacts of the cutout relay are in series with the ungrounded wire between the generator output (armature) terminal and the battery. When the car motor turns the generator over at sufficient speed to develop a voltage greater than the battery voltage, the contacts close and the generator is connected to the battery. When the motor is slowed down, and the generator voltage falls below the battery voltage, the contacts open, disconnecting the generator from the battery.

The current-regulator relay is for the purpose of protecting the generator against overload. Its contacts are connected across a resistor in series with the field winding of the generator. When the load on the generator exceeds the current value to which the regulator has been set, the contacts open and close, intermittently inserting the resistor in series with the field winding at a rate that limits the average output current to a

value that is safe for the generator to handle. Some older-model cars do not have this current-regulator unit.

The purpose of the voltage-regulator relay is to assure adequate battery charging, while preventing damage to the battery from overcharge. Its contacts are also connected across a resistor in series with the field winding of the generator. When properly adjusted, it will regulate the average generator output voltage so as to cause the battery charging current to rise to a value near the maximum safe limit set by the current regulator, and taper off almost to zero current as the battery nears full charge. The life of the battery is highly dependent upon proper adjustment of the voltage regulator.

The design, operation and adjustment of charging regulators vary appreciably among the various makes and models. Proper adjustment requires special data, gauges and instruments not often in possession of anyone but qualified electromotive service shops. The critical setting of several spacings according to manufacturer's specifications is required. It is seldom a simple matter of tightening or loosening the tension of a spring. An amateur who makes a mobile installation should ask the service shop to check the adjustment of the current regulator to make sure that it is set for the maximum output current for which the generator is rated. This will permit maximum safe output from the generator when operating from the car motor, and will allow maximum control of the charging rate by the voltage regulator.

In general, there is little to be gained by a readjustment of the voltage regulator from its original proper setting, although it would be well to have a service chop check the adjustment periodically to maintain the proper adjustment. Voltage-regulator operation depends to a large extent upon the difference between the battery and generator voltages at any given time. So long as the load current drawn does not exceed the current limited by the current regulator, the battery voltage will be unaffected, and the voltage regulator will control the battery charging current in the normal way. If, however, the total current drawn from the system exceeds the current for which the current regulator is set, the current from the generator will be limited by the current regulator, not by the voltage regulator, and the extra current will be drawn from the battery.

When the external load is removed, the voltage regulator will act in normal fashion, causing the charging current to rise to maximum until the battery is again near full charge. Setting the voltage regulator to a higher limiting voltage will not speed up the recharging, because the charging current is limited by the current regulator to a value that is safe for the generator, as mentioned previously. Increasing the limiting voltage of the voltage regulator will, however, result in continued charging at an excessive rate after the battery has reached full charge, and this can cause reduced battery life.

NEW BOOKS

Yagi-Uda Antenna, by Shintaro Uda and Yasuto Mushiaki, Tohoku University, Japan. Published by Sasaki Printing and Publishing Co., Ltd., 27 Tsutsumi-dori, Sendai, Japan. Obtainable from Zeitlin & Ver Brugge, 815 N. La Cienega Blvd., Los Angeles 46, California. 183 pages, including index. Schematics. $6\frac{1}{4} \times 8\frac{1}{2}$ inches. Cloth cover. Price, \$4.00.

This is no doubt the most complete discussion of the parasitic beam originated by Dr. Yagi yet published. The first five chapters are on antenna theory, including treatment of the equivalent radius of various forms of conductors in linear antennas, mutual impedance of parallel antennas, antennas with discontinuous thickness, and the general theory of the Yagi. The remainder of the book — it has thirteen chapters in all — is largely given to the practical design of two- and three-element beams, with sets of graphs useful for design purposes.

Television for Radiomen, revised edition, by Edward M. Noll. Published by The Macmillan Company, 60 Fifth Ave., New York 11, N. Y. Part I, black and white, Part II, color television. Part I, 662 pages, Part II, 108 pages. $6\frac{1}{2} \times 9\frac{1}{4}$ inches. Price, \$10.00.

This is a comprehensive, descriptive text covering modern television circuits and their operation. Intended as a course for technicians as well as a reference manual, it is distinctly practical in approach and largely nonmathematical in treatment. (A separate chapter on "Practical Television Mathematics" collects the design formulas most frequently used in circuit work.) The revised edition now includes sections on u.h.f. and color.



August 1930

... The "Old Man," describing the Wouff Hong, tells that since the beginning of amateur radio it has meant "the one or the other" — either law and order or the Wouff Hong!

... Harry Wells, W3ZD, relates his exciting operating experiences with the *All-American Lyric Malaysian Expedition* to Borneo. The call used was PMZ.

... "The First Conviction Under the Radio Act," by Porter H. Quinby, W9DXY, tells how St. Louis amateurs cooperated in running down an unlicensed station.

... In "Dummy Antennas," by Guy C. Omer, jr., W9EBF/W9FSC, a description of a modern dummy load is presented. It incorporates a variable capacitor and iron wire wound on strips of wood.

... ARRL Headquarters station W1MK operates on 3575 and 7150 kc.

... "The Third International Relay Competition," by E. L. Battey, gives a run-down of results of this popular contest. Hats off to W6BAX who hit the jack pot with a sizzling 3210.

... W9DRD gives the low-down on 7-Mc. crystals, the youngest useful members of the piezo family, in this month's Experimenters' Section.

... A pioneer 14-Mc. 'phone station, W9ANZ, Louis F. Leuck operator, is the station of the month. Using a Type '03A in the final and a UV-211 in the modulator, W9ANZ emits an "ear-busting" signal.

Revision of 6-Volt Equipment for 12-Volt Operation

UNFORTUNATELY, there is no simple and inexpensive way of converting existing 6-volt mobile installations for operation in the newer cars having 12-volt battery and charging systems.

The simplest solution is provided by a dynamotor that has 12-volt input and 6-volt output. Such a dynamotor is produced by the Carter Motor Co., and is called the "Change-a-Volt." It is rated at 15 amperes, 6 volts output continuously for receiver operation, and 45 amperes intermittently for transmitter use. The cost of this unit, however, is comparable with that of a new power unit for 12-volt input. There is also, of

models in each type that are designed for either 6- or 12-volt input. It would be advisable for anyone now contemplating an installation in a car with a 6-volt system to purchase one of the dual-input types to cover future use with a 12-volt system.

Filaments

You may be lucky enough to find 12-volt equivalents for all of the 6-volt tubes in your installation, but this will rarely be the case. The simplest and most efficient filament conversion consists of dividing the 6-volt tubes into two groups totaling, as closely as possible, the same current. The two groups are then connected in series, as shown in Fig. 1. If the two branches cannot be matched exactly, a resistor should be connected across the branch of lesser current to make the total current of this branch equal the total current of the other. The value of the resistor in ohms should be

$$R = \frac{6.3}{I_1 - I_2},$$

where I_1 is the greater total current and I_2 the lesser, in amperes.

This system can be applied to any number of tubes greater than 1. A single tube will, of course, require a simple series resistor, as shown in Fig. 1B. The value of this resistor in ohms should be

$$R = \frac{6.3}{I},$$

where I is the rated filament current of the tube in amperes.

In this revision of the filament wiring, it is obvious that only one side of one group of filaments may be grounded to the chassis. One side of this group and both sides of the second group must be insulated from the chassis. — D.H.M.

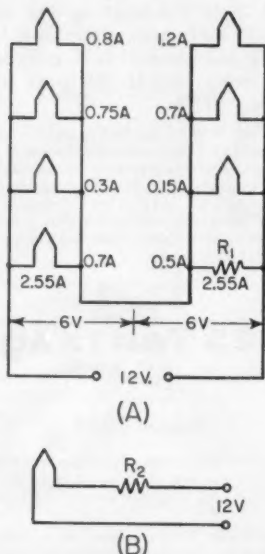


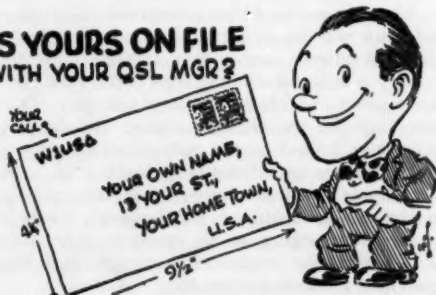
Fig. 1—(A)—Showing the connection of 6-volt heaters in series-parallel for 12-volt operation. R_1 is used to equalize the currents in the two branches. (B)—A single 6-volt heater will require a series resistor, R_2 , for 12-volt operation.

course, a loss of power in the conversion from 12 to 6 volts.

Both dynamotors and vibrator packs are available from 12-volt input, and there are some

- Most makes of cars are turning to the use of 12-volt electrical systems. This is a definite advantage for heavy loads, such as mobile transmitters. Here are suggestions for operating 6-volt equipment from 12-volt systems.

IS YOURS ON FILE
WITH YOUR QSL MGR?



A Six-Meter Club Project

*Andrews Electronic Association Builds 50-Mc. Gear
on Production-Line Basis*

BY JOHN P. DRUMMOND,* W3YHI

THE Andrews Electronics Assn., Andrews Air Force Base, Md., recently took on the construction of 6-meter rigs as a club project. As a result, eleven stations are making their 50-Mc. debut near Washington, D. C. All but one are entering the v.h.f. ranks through this project, and more are expected to follow shortly.

This work was undertaken as a result of many factors. Members had long agreed that a project was needed to stimulate club interest. There were as many ideas as to what its nature should be as there were club members. Opening of the 6-meter band for Technician operation was then in prospect. AEA had previously considered a 2-meter project to provide improved local communications for the club's "Windbagger's Net" but there was obvious need for more activity on 50 Mc. Previous club experience in sports car races and in providing communications of an emergency nature had emphasized the need for more suitable equipment. The v.h.f. bands appeared to provide the best solution, but none of the equipment owned by the members could be used for v.h.f. work. The 50-Mc. band seemed like the optimum frequency, as it would be easier to construct equipment and better local range could be expected with simple antennas than on 144 Mc. Then there was the technical challenge of potential TVI with fringe-area reception of Channel 2 from Baltimore. AEA's previous stand had been in favor of opening both 2 and 6 meters to Technicians. Although AEA opposed the ARRL position against opening 144 Mc. to Technicians, it accepted the League's decision and was prepared to support the will of the majority actively.

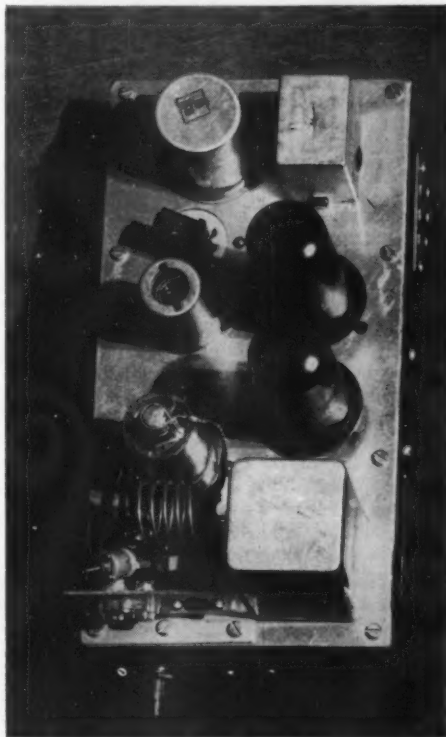
The usual problems were involved in getting a group to tackle a new problem. Again there were nearly as many ideas as members. Some were not interested in 50 Mc.; some had no construction experience; others had no place to work. A questionnaire was made up to determine the general characteristics of the equipment desired by the majority and their willingness to assist each other in a cooperative production-line assembly project. The writer was given the task of designing and building a pilot model of the transmitter. The poll of the members had indicated that a unit of 15 to 20 watts input was desired. It was to be of simple design, rugged, and inexpensive to build, as each member was to pay for his own.

The model transmitter was built and a major portion of one meeting was devoted to an "on-

the-air" 50-Mc. session with W3OJU, during which Rick did an excellent job of answering questions thrown at him by the AEA membership. The thoroughness of W3OJU's sales talk was proven that same night when AEA voted to proceed without delay.

For economy reasons, the transmitter was designed largely around parts stripped from AN/ARC-4s, as we had a source of these units. The final design met the simplicity requirement. It employed a 12AT7 overtone oscillator-doubler driving a 2E26 final amplifier. The modulator is a pair of 6L6s driven directly from the microphone transformer. Input runs around 20 watts. A list was made of the parts and tubes which had to be purchased.

Ten members immediately indicated the desire to build similar transmitters and they put their cash on the line to prove it. The base hobby



The finished product, a 50-Mc. transmitter complete with modulator. The r.f. section is similar to *Handbook* design, but modified to make use of available surplus parts. (USAF photos)

*% Hq., AACs, AAFB, Washington, D. C.



Members of the Andrews Electronics Assn. who participated in the 50-Mc. transmitter construction project. *Front row, l. to r.: WN3ZTA, W3URQ, W3RV, W3HGY, M. P. Hixson. Middle row: WN3ALG, W3YQV, W3YHI, Major Gikas, W3VBE. Standing: W0DDC, W3TPT, W3WWQ, W3ZQD, W3UBZ, W0QBK.*

shop was selected as a site for construction, and one member was nominated to purchase the parts. Special meetings were set up for every Friday night to carry the construction through to completion. The meeting then adjourned and the committees swung into action.

Sufficient ARC-4s were rounded up to provide the parts sources. The writer drafted a step-by-step instruction sheet for removal of the parts to be used, and both were distributed among the members in advance. To the amazement of those who felt that the project would not catch on, more than 75 per cent of the membership showed up the first night, loaded with tool boxes and ready to work. Club Prexy W3TPT staggered in bearing a large carton with the purchased parts and announced that he'd cleaned the local dealers out. The final cost per transmitter was less than \$10.

Workers were assigned to places in a production line headed by W3VBE, who had previously made a template for the chassis. Hacksaws, drill presses and soldering irons were manned and we were under way. The chassis work (usually the toughest construction job) was accomplished in a surprisingly short time as a result of the production-line techniques and the availability of willing hands. All chassis were then run back down the line for the mounting of parts and pre-fabricated assemblies which had been prepared by other members. Wiring was done by following simple step-by-step instructions prepared by the writer in the manner used by the Heath Co. for their kits.

Although this project is not at this writing fully completed, it has caused considerable comment in the Washington area. A number of requests have been received for information on the transmitter design, method of starting the project, etc. Certainly AEA can expect some TVI cases to pop up, but they will be sought out and treated as necessary. A club project of this sort for 50 Mc. is not, in itself, new. Nothing new in the way of equipment development resulted

from this one. AEA feels, however, that the project has accomplished several very worthwhile things to date. It has proven that a club can take on a project type that is new to its members and in doing so draw the members closer together in the common cause. It has also proven our democratic principles of majority rule can be accepted with good grace and that unity can exist within the amateur ranks — even among those who "lost" an issue.

We'll be seeing you on 50 Mc.

Silent Keys

It is with deep regret that we record the passing of these amateurs:

W1AFB, Ray C. Lowery, West Hartford, Conn.
W2AET, ex-WICMR, Louis E. Robitaille, Bayside, L. I., N. Y.
W2LDG, Charles G. Zaepfel, Irvington, N. J.
WN3BCQ, Glenn C. Bream, Gettysburg, Pa.
W3GV, ex-W8GU, F. Dawson Bliley, Erie, Pa.
W3YDI, Robert H. McBride, Butler, Pa.
ex-W4DBC, Ralph G. Kingston, Ft. Myers, Fla.
KN6BXD, Robert W. Fuller, Chico, Calif.
W6OVM, Abraham W. Turkel, San Francisco, Calif.
W7JTF, William J. Dobyns, Tacoma, Wash.
W7JFG, Napoleon J. Tremblay, Tucson, Ariz.
W7NK, Francis J. Brott, Seattle, Wash.
W7RYP, Chester J. Markl, Phoenix, Ariz.
WN7ZSK, Paul R. Potter, Colville, Wash.
W8LOH, William H. Sutton, Detroit, Mich.
W8UZV, William F. Diekmann, Canton, Ohio
W9AUR, Earl F. Kell, Aurora, Ill.
W0CFL, Albert W. Hodge, Kansas City, Mo.
W0PUF, William J. Aitchison, Warren, Minn.
VE3QB, W. A. Knowles, Lanark, Ont.
DL3OP, Rudolph Liefand, Rendsburg-Budelsdorf
DL1XF, Werner Slawky, Grossheide
F8AK, Maurice Nardeux, Loches
F8PH, Marie-Claire Jeannaud, Gujan Mestras, Gironde
GW5WU, Douglas A. Low, Cardiff, Wales
OH2ND, Erkki Kairenius, Helsinki
ON4HD, Henri R. Deceuninck, Emelgem-Izegem
VU2GB, G. A. W. Ballantyne, Bombay
YV5BE, Carlos Lenfant, Chacno, Miranda

• Recent Equipment —

The Viking Adventurer

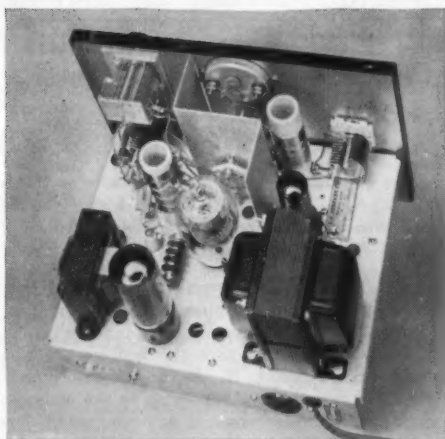
THE "Adventurer" is a small transmitter which, while no doubt having special appeal to Novice licensees because it is crystal-controlled and operates at a 50-watt final-amplifier input level, also would be useful as an exciter for a higher-power amplifier in the 3.5- to 28-Mc. bands. The power output should be ample for driving a tetrode of fairly large power input. The aluminum cabinet has been designed for good

capacitive coupling to the 807 grid is used in the oscillator plate circuit. The 807 plate tank is a pi network with constants selected so that loads ranging 50 to 600 ohms can be fed. In both tanks the various bands are covered by tapped tank coils, the unused portions of which are shorted out by the bandswitch. Both coils are sectional-wound to reduce the coupling between the active and shorted portions and thus minimize losses in

»

The "Adventurer" is a two-tube 50-watt input transmitter covering the amateur bands between 3.5 and 30 Mc. The dual-range milliammeter (0-20 and 0-200 ma.) can be switched to read either grid current or plate current in the final amplifier. The control at the upper right is for the 700- μ f. variable output capacitor of the amplifier pi network. The slide switch just below it cuts a 700- μ f. fixed capacitor in parallel for additional output capacitance.

»



shielding and the 115-volt and keying leads (the only ones that have external connections) are fitted with harmonic filters for the TV frequencies. The transmitter is available only in kit form, and the only accessories required are a key and crystals.

There are two r.f. tubes, a 6AG7 oscillator and 807 amplifier/doubler. The oscillator uses the Pierce-type circuit with the crystal connected between grid and screen, output being taken from the plate. Conventional parallel tuning with ca-



«

The oscillator and amplifier tank coils are wound on ceramic forms, with sections for the various bands separated as shown to reduce losses. The higher-frequency sections are space-wound. The phono-type connector at the left on the rear lip of the chassis is for coaxial output from the amplifier tank.

«

the "dead" turns. The oscillator and amplifier switch sections are ganged, but are separated by a shield partition to prevent unwanted coupling between the two circuits.

In the main, the r.f. circuits conform to standard practice and are quite straightforward. The oscillator operates straight-through on the 3.5-Mc. band, 80-meter crystals being specified (although presumably a 160-meter crystal could be used for this band if one happens to be available). For 7-Mc. operation, either 80- or 40-meter crys-

tals may be used, with frequency doubling in the oscillator plate circuit in the former case. Forty-meter crystals are recommended for 14-Mc. and higher-frequency operation; the oscillator doubles for 14-Mc. operation, triples for 21 Mc., and doubles for 27-28 Mc., where the 807 is also used as a frequency doubler. On 21 Mc. and all lower-frequency bands, the 807 operates as a straight-through amplifier. Since the driving power tends to become excessive on the lower frequencies, a 2700-ohm 1-watt resistor is connected between the 21-Mc. tap and the cold end of the oscillator tank coil (shorting for the higher frequencies moves progressively from the cold end) to absorb some of the excess power. This arrangement results in reduced "swamping" by the resistor on 14 Mc. particularly, and cuts out the additional loading entirely on 21 Mc.

Simultaneous cathode keying of both tubes is used in the "Adventurer." There is no built-in provision for shaping of the keying waveform. VFO-input terminals are provided, connecting

between the 6AG7 stage grid and ground.

Plate and heater power are both obtained from the same power transformer. The rectifier is a 5U4G, working into a capacitor-input filter consisting of two capacitors and a choke. The output voltage is approximately 450 at a full-load current of 150 ma. Power leads are brought out to an octal socket on the rear chassis apron so the power supply can be used for other purposes if desired. The transmitting tubes remain connected under these conditions, but the full d.c. output is available for external use if the key is left open. To use the maximum available heater current of 2 amperes externally requires removing the oscillator and amplifier tubes from their sockets. The same "accessory" socket can be used to operate a device of low power consumption, such as a VFO, with the transmitter in full operation.

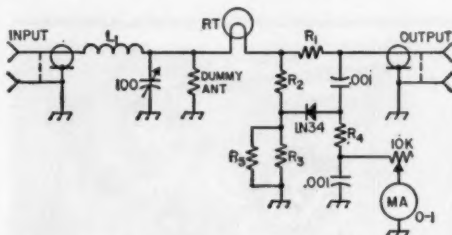
The panel size is $7\frac{3}{8}$ by $10\frac{3}{8}$ and the transmitter is $8\frac{1}{2}$ inches deep. Like other Viking units, the "Adventurer" is a product of the E. F. Johnson Company. — G.G.

Models 650 and 651 Matchmasters

THE B & W "Matchmaster" is a piece of test equipment incorporating a dummy antenna, standing-wave ratio bridge, and r.f. power meter in one unit. It is made in two impedance levels matching the two commonly-used types of coaxial line, Model 650 being set up for 52-ohm lines and Model 651 for 73-ohm lines. The dummy antenna, which uses noninductively-wound wire resistors, has a continuous rating of 100 watts and an intermittent rating of 125 watts. Power in the dummy antenna is measured by means of a rectifier-type voltmeter, using a 1N34, connected through a voltage divider across the dummy load.

The essentials of the dummy antenna and s.w.r.-bridge circuits are shown in the accompanying diagram, in which the power-reading voltmeter and switching details have been omitted. One interesting feature is the compensating cir-

cuit for the dummy load, consisting of L_1 (2 spaced turns $\frac{3}{4}$ inch in diameter) and the 100- μ f. variable capacitor. The purpose of this circuit is to reduce reactive effects, particularly at the high-frequency end of the useful range of the instru-



Basic circuit of the "Matchmaster" dummy antenna and s.w.r. bridge.

ment, and to provide a means for adjusting the resistance to the proper value. The adjustment is an internal one and is made at the factory.

The s.w.r. indicator uses the well-known resistance-bridge circuit. R_1 , R_2 , and R_3 are equal resistors having a value the same as the characteristic impedance of the line to be matched. R_4 and R_5 are identical and are of high value compared with the other three, R_4 being used to isolate the d.c. meter circuit from the r.f. bridge, and R_5 to balance the shunting effect of R_4 . The 10,000-ohm variable resistor is for setting the meter sensitivity to conform to the power taken from the transmitter. The instruction book states that power inputs between 10 and 100 watts will permit proper operation of the bridge.

An innovation in the bridge circuit is the use of a ballast lamp, RT , to maintain the r.f. voltage applied to the bridge at a reasonably-constant



The "Matchmaster" is a combination of dummy antenna, r.f. wattmeter, and s.w.r. bridge, and is useful for testing and adjustment of transmitters and antenna systems. Dimensions are $8\frac{1}{4}$ by $8\frac{1}{4}$ by $6\frac{1}{4}$ inches.

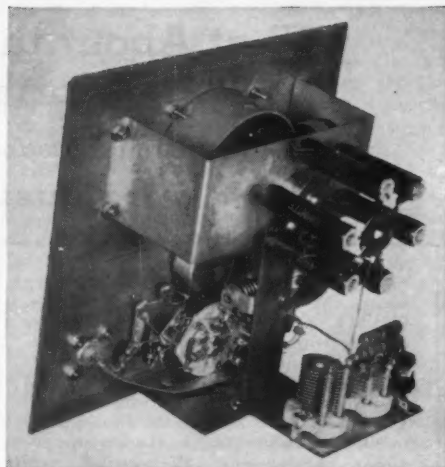
»

Inside view of the "Matchmaster." Six noninductive wire-wound resistors in parallel form the dummy antenna. The variable capacitors at the lower right are used in frequency-compensating circuits for the dummy antenna and wattmeter voltage-divider.

»

value when different loads are connected to the output terminals. The ballast, a GE 15-watt 120-volt miniature-base lamp, would seem to be a worth-while addition to such a bridge when no other means is used for keeping the input voltage constant (the importance of this has been stressed many times in both *QST* and the *Handbook*, when reasonable accuracy is to be attained in s.w.r. measurement).

A three-position switch is used for the various functions. In one position the d.c. instrument, a 0-1 milliammeter, is connected to the line r.f. voltmeter for power measurement. In this position the s.w.r. bridge and output connector are disconnected. In the second switch position both the dummy load and s.w.r. bridge are connected to the input terminals and the milliammeter is switched to the bridge-indicator circuit, while the output terminals are still disconnected. This posi-



tion permits adjusting the meter reading to full scale for subsequent s.w.r. measurement. The third switch position adds a connection between the bridge and the output terminals, giving the s.w.r. reading. Since the dummy antenna is permanently connected in all three switch positions and the s.w.r. bridge is of the low-power type, the "Matchmaster" cannot be left in the line after tests and adjustments have been made.

The dummy antenna is specified to have a standing-wave ratio of 1.2-to-1 or less at all frequencies up to 30 Mc., and the power meter will give useful readings at frequencies between 500 kc. and 30 Mc. — G.G.

A.R.R.L. QSL BUREAU

The function of the ARRL QSL Bureau system is to facilitate delivery to amateurs in the United States, its possessions, and Canada of those QSL cards which arrive from amateur stations in other parts of the world. Its operation is made possible by volunteer managers in each W, K and VE call area. All you have to do is send your QSL manager (see list below) a stamped self-addressed envelope about 4¼ by 9½ inches in size, with your name and address in the usual place on the front of the envelope and your call printed in capital letters in the upper left-hand corner.

W1, K1 — J. R. Baker, jr., W1JOJ, Box 232, Ipswich, Mass.
 W2, K2 — H. W. Yahnel, W2SN, Lake Ave., Helmetta, N. J.
 W3, K3 — Jesse Bieberman, W3KT, Box 34, Philadelphia 5, Penna.
 W4, K4 — Thomas M. Moss, W4HYW, Box 644, Municipal Airport Branch, Atlanta, Ga.
 W5, K5 — Oren B. Gambill, W5WI, 2514 N. Garrison, Tulsa 6, Okla.
 W6, K6 — Horace R. Greer, W6TI, 414 Fairmount St., Oakland, Calif.
 W7, K7 — Mary Ann Tatro, W7FWR, 513 N. Central, Olympia, Wash.
 W8, K8 — Walter E. Musgrave, W8NGW, 1294 E. 188th St., Cleveland 10, Ohio.
 W9, K9 — John F. Schneider, W9CFT, 311 W. Ross Ave., Wausau, Wisc.

W0, K0 — Alva A. Smith, W0DMA, 238 East Main St., Caledonia, Minn.
 VE1 — L. J. Fader, VE1FQ, 125 Henry St., Halifax, N. S.
 VE2 — Harry J. Mabson, VE2APH, 122 Regent Ave., Beaconsfield West, Que.
 Leslie A. Whetham, VE3QE, 52 Sylvia Crescent, Hamilton, Ont.
 VE4 — Len Cuff, VE4LC, 286 Rutland St., St. James, Man.
 VE5 — Fred Ward, VE5OP, 899 Connaught Ave., Moose Jaw, Sask.
 VE6 — W. R. Savage, VE6EO, 329 15th St., North Lethbridge, Alta.
 VE7 — H. R. Hough, VE7HR, 2316 Trent St., Victoria, B. C.
 VE8 — W. L. Geary, VE8AW, Box 534, Whitehorse, Y. T.
 VO — Ernest Ash, VO1A, P. O. Box 8, St. John's, Newfoundland.
 KP4 — E. W. Mayer, KP4KD, Box 1061, San Juan, P. R.
 KH6 — Andy H. Fuchikami, KH6BA, 2543 Namauu Dr., Honolulu, T. H.
 KL7 — Box 73, Douglas, Alaska.
 KZ5 — Gilbert C. Foster, KZ5GF, Box 407, Balboa, C. Z.

ARE YOU LICENSED?

• When joining the League or renewing your membership, it is important that you show whether you have an amateur license, either station or operator. Please state your call and/or the class of operator license held, that we may verify your classification.

What About the Low-Frequency Harmonics?

A Serious Problem for the Amateur Newcomer

BY CHARLES L. WOOD,* W2VMX

• Although most hams these days worry about TVI from their v.h.f. harmonics, W2VMX points out that even more serious trouble can be caused by the low-order (second, third, etc.) harmonics that may interfere in channels used by important communications services. This should be of special significance to the Novice working on the 80- and 40-meter bands, since the second harmonics fall outside the bands assigned to amateurs.

THE problem of harmonics in amateur radio is by no means limited to the matter of TVI. The v.h.f. harmonics which so irk the XYZ and the neighbors have simply received more attention in recent years. Yet there are many hams on the air today radiating strong signals, outside amateur bands, that do *not* bother TV sets. Too often, the first inkling of trouble in these cases is a letter from the FCC. ARRL Official Observers are sending many post cards to amateurs in this category. It is sincerely hoped that this service will save many hams from FCC notices. Our station alone has sent cards to several *hundred* different amateurs heard outside amateur bands in the last few years.



If you would have first-hand knowledge of the situation, sweep the spectrum from 7350 to 7500 kc. on any Sunday afternoon. We have heard harmonics so thick in this region that some stations couldn't be copied because of harmonic QRM from others.

Granted that a problem exists, what are we going to do about it? Let's begin by asking where this unwanted energy comes from. A *harmonic* frequency is simply an integral multiple of some given frequency called the *fundamental*. For instance, if your transmitter operates on 3705

kc., the second harmonic is at 7410 kc., and the third is at 3×3705 or 11,115 kc. Regardless of the kind of transmitter you use, whether homemade or store-bought, small amounts of energy at these harmonic frequencies are present in your final tank along with the useful energy at the fundamental frequency. Such energy can create problems whenever (1) there is a large amount of harmonic energy generated or (2)



when conditions exist under which the harmonic energy may be easily radiated. Either condition alone may be bad; the combination is an invitation for FCC action.

The files of our station contain quite a number of letters and comments from the stations to whom we have sent ARRL Official Observer cards. These letters show that the chief reasons for the harmonics we have heard are, in order, carelessness, ignorance of the situation, and the inability to correct the problem. Let's go through the most common mistakes and see whether we can avoid these pitfalls.

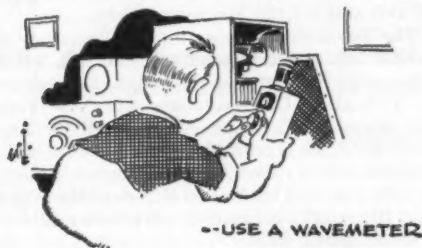
Use a Wavemeter

The first question in chasing low-frequency harmonics should be this: To what band is the final tank circuit tuned? Many Novices are building bandswitching rigs. Many others have built rigs in which the final tank capacitor, without any change in the tank inductor, will tune, for instance, to both 3.7 and 7.4 Mc. In the case of the bandswitching transmitter, the danger always exists that the operator will, without thinking, leave a 3.7-Mc. crystal in place when the bandswitch is turned to the 7-Mc. band. A frequency-doubling action takes place and the full output of the transmitter is then radiated on a frequency outside the amateur bands. In the case of the transmitter which will tune both bands without replacing the inductor, the operator must at all times *beware* of the resonance point which uses the *lesser* capacitance

* 609 Park Ave., Collingswood 7, N. J.

of the tuning capacitor. A special case of this same trouble may exist where the transmitter is operated from a crystal or VFO in the 160-meter region. In such a transmitter it is sometimes possible to tune a multiplier stage to the third harmonic around 5.4 Mc., instead of the intended second harmonic near 3.7 Mc. Again, it sometimes happens that the output of a doubler stage tuned to 3.7 Mc. may contain sufficient energy at 5.4 Mc. to drive a final so that it will show a pronounced dip at resonance at 5.4 Mc.

What can be done to make sure the final is tuned to the right band? The FCC regulations provide that the frequency of the transmitter must be checked from time to time. Unfortunately, we can't rely on the receiver to tell us about harmonics. If we have a 3.7-Mc. transmitter right next to the receiver, we will probably hear a signal every 3.7 Mc. right up the dial. The instrument we need to be sure of the right band is called a wavemeter. An excellent unit that can be built for just a few cents was described in *QST* recently, complete with a cut-out dial.¹ A more elaborate and more sensitive instrument was described by another author



in the February issue of this year.² The latter can be used to indicate the presence of very small amounts of harmonic energy at 5.4 and 11 Mc.

Tank-Circuit Q

If we find that the final tank is not tuned to the right band, the necessary correction is easy enough. If the tank is tuned to the right place but there is enough unwanted energy to give an indication on the wavemeter, this is another problem. Then we must find out whether the unwanted signal is coming from the final or from some previous stage. Always correct the trouble on the lowest power level.

High-Q tank circuits will minimize harmonics in lower-level stages. Harmonic generation in amplifier stages can be minimized by reducing drive to the lowest practical level. Consult

¹ Smith, "The Measuring-Cup Band-Spotter," *QST*, Sept., 1952.

² McCoy, "The Baking-Pan Wavemeter," *QST*, Feb., 1955.

³ Also see McCoy, "A 5-Band Antenna Coupler," *QST*, April, 1955.

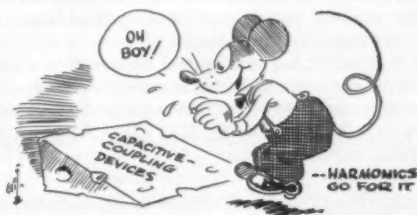
⁴ Although the minimizing of the number of turns in the link coils is desirable in reducing harmonic output, it has been pointed out previously in *QST* that adequate output coupling sometimes requires a larger link winding than that supplied by coil manufacturers. This is particularly true when working into higher-impedance lines, such as 300-ohm Twin-Lead. — Ed.

the *Handbook* for proper grid drive, and do not exceed this figure. These are just two of the ways to help cut harmonic generation in the transmitter. After we have worked on this angle, we will probably want to ask if we can cut down the radiation of unwanted frequencies. The answer in most cases is yes.

Antenna Coupler

Let's make up our mind that some sort of antenna-tuning device is always in order, not only to get the greatest efficiency from the radiator, but also to cut down spurious signals. Good designs are given in the *Handbook*,³ and many excellent commercially-built units and kits are on the market. Where tuners provide for a grounding arrangement, this should always be the very best and most direct ground. One special precaution is in order, based on reports we have received. Don't overcouple the transmitter to the antenna or tuner! Beginners sometimes get the idea that the more turns there are in a link, the more r.f. will be coupled to the antenna. As a result, we have heard of links of ten and twenty and even thirty turns. Remember that such an arrangement is not only a link but a very effective capacitive-coupling device — something harmonics love like mice love cheese. Any two pieces of metal separated by an insulator form a capacitor of sorts, whether these be flat plates (as in an air variable) or rolled foil (as in a paper capacitor) or in coil form. Notice commercially-made coils for the 40- and 80-meter amateur bands. Usually these have only two turns, or three at the most.⁴

Measures which you have probably already taken in connection with TVI will also help with your low-frequency harmonics. For example: A Faraday shield in the final tank link, coax from this link to the shielded antenna tuner, and a shielded link in the tuner unit itself, grounding



of center taps of coils in balanced systems, and the like, are all beneficial. A low-pass filter will not have any effect whatever on low-frequency harmonics, since it is usually designed to pass everything below 30 Mc.

There are always a few special cases, and it may be that your rig seems to radiate unwanted signals despite everything that you have done to it. This is a good place for a huddle at the local club, as two heads are usually better than one at this point. If it is a manufactured item, write telling the maker exactly what happens, and follow his suggestions carefully. If your

(Continued on page 136)

The Buffalo Area RACES Organization

Getting Organized for Civil Defense Service in Erie County, N. Y.

BY C. E. JOHNSON, JR.,* W2PPY

• In past QSTs we have given you much information and advice on how to get set up for RACES. This article will tell you about Erie County's working organization, how it got that way and why.

ERIE COUNTY, New York, is the 13th largest county in the United States and has an area of 1042 square miles. There are three cities within its boundaries, namely, Buffalo, Lackawanna and Tonawanda with a total population of approximately 1,000,000 people.

The task of establishing suitable RACES networks within a county of this size was a formidable one. The local civil defense director required communications via amateur radio from one end of the county to the other. The terrain in the county ranges from flat to extremely hilly and the problems of reliable communications were many and varied.

Our first task was to decide how and on what frequencies the required networks would be established. A quick check of the RACES frequencies available to Erie County showed we had 10-, 6- and 2-meter frequencies available. After much discussion it was decided to build our networks around 6 and 2 meters, although there were many 10-meter mobile units available. Ten meters had been found undependable for short-range communications. In the civil defense test of 1953 this band opened up and stations from all parts of the county were calling our main control station causing confusion and chaos.

Erie County has two control centers, four zone headquarters, six aid check points and fifteen township report centers. The main control center

is located in the town hall in Lancaster, N. Y. This station, and its alternate, are able to operate on any RACES frequency assigned to Erie County by state civil defense. Three six-meter nets are controlled by 17-watt transmitters feeding ground-plane antennas: the Zone Headquarters Net on 53.6 Mc.; the Aid Check Point Net, 50.6 Mc.; and the Support Area Net on 53.74 Mc. This small amount of power seems ample for the distance to be covered. All other nets are controlled by 100-watt crystal-controlled transmitters feeding ground-plane antennas on 2 meters. One transmitter handles mobile control for the NE and SW Zone Headquarters on 145.200 and 145.320 Mc. respectively. A similar transmitter is used to control the mobile units for the NW and SE Zone Headquarters operating on 147.000 and 147.120 Mc. respectively.

The Township Net operates on a frequency of 145.440 Mc. and the State Command Net, which is the main link between the target city and the N. Y. State C.D. Headquarters in New York City operates on a frequency of 145.680 Mc. Any traffic for State is relayed via this net to a high-powered station called Area Ten Control Station, on 3509.5 or 3993 kc. located outside of the target area. There are two spare transmitters available at each Control Center.

The main target city, Buffalo, is divided into four zones. These zones are actually fully equipped control points with each service represented. Each of our zone Headquarters has a RACES installation capable of controlling any of nine mobile units assigned to it, or of contacting the Control Center should the need arise. The mobile control transmitter is 100 watts and the unit for contacting Control Center is 17 watts, both using ground-plane antennas. On 2 and 6 meters respectively the mobile units are small, compact

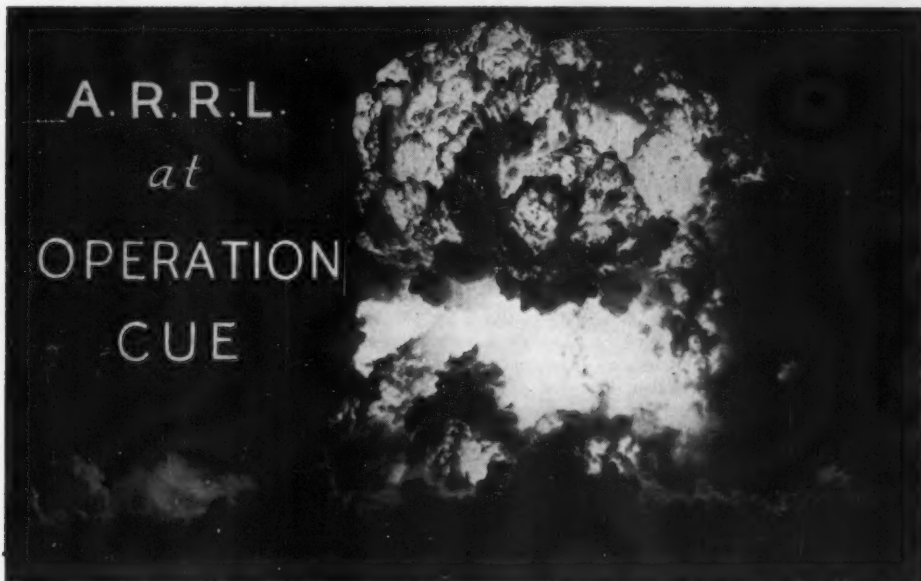
(Continued on page 120)

* Radio Officer, Erie County Civil Defense, Room 218, City Hall, Buffalo, N. Y.

(Left): The EC and Radio Officer does his operating chore along with the rest of them. Here W2PPY operates one of the transmitters in the Erie County Control Center. *(Right):* The Zone Control Centers are busy places in any drill or test, as they will be if the real thing comes. This is Northeast Zone Control, with (l. to r.) operators Larry Thomas (non-amateur), K2GJP, K2HJB and K2GUG. Looking over their shoulders is K2DVD, Chief of Zone Communications.



A. R. R. L. at OPERATION CUE



(United Press Photo)

The ARRL National Emergency Coördinator's Report of the League's Participation in FCDA's Yucca Flat Atomic Test Observer Program

BY GEORGE HART, WINJM

"The shot is on!"

None of us really believed it. There had been too many such announcements during the previous nine days to have this one stir up any excitement. All it meant to most of us (that is, those of us who were still waiting) was another wearying bus ride to the AEC's Nevada Test Site, 90 miles away, probably to be followed by another last-minute postponement. By this time, we were hardened to such disappointment. Already we had journeyed to Yucca Flat three times, stood around in the freezing cold (and once in the freezing rain), went completely without sleep, except what we could snatch during the bus ride, only to be returned to Las Vegas without having seen anything except a lot of dry desert.

It was Wednesday evening, May 4th. To most of us observers, the weather looked favorable. There was very little breeze and visibility was good. A scattering of high cirrus clouds was expected to dissipate before morning. Once before, just a week ago, the weather had looked exactly like this, so we weren't too optimistic. Nevertheless, at 0400, the announcement was made that the shot was "on." Our long days of waiting seemed about to pay off. We kept our fingers crossed.

The time from then on flew rapidly. At 0430 daylight started to appear in the east, but it was still quite dark to the north, in the direction of the shot tower. At 0500, observers and media (press, radio, TV, etc.) personnel started shifting

around to find better vantage points to watch the shot. At 0510 minus thirty seconds we adjusted our high-intensity dark glasses (through which ordinary sunlight is scarcely visible) and listened to the countdown over the public-address system.

The "Shot"

At exactly "zero" there came a blinding white flash (bright yellow through our glasses) and a sudden wave of heat. After three seconds we cautiously removed our glasses and watched the fireball form into its typical mushroom and fade through the color spectrum, from yellow to orange to red and finally to purple. Within fifteen seconds all that was left was a gigantic black mushroom with a whitening cap (ice crystals). This cap gradually detached itself from the rest of the mushroom and, rising gradually, it turned brown. Just beneath it a scraggly black cloud was forming, and at the base a cottony gray cloud of dust was spreading rapidly. The brown cloud, highly radioactive particles remaining from the shot tower, rose rapidly and approached the observer area. When it reached 40,000 feet, however, it was

• At the invitation of FCDA, the League sent its NEC to take part in Operation Cue. Some of his observations, including participation by amateurs, are presented herewith.



caught in a "shear" wind and dispersed. At the end of an hour, it was no longer visible. The black cloud, also radioactive but less so, rose more slowly and was eventually also dispersed. The gray cloud of dust spread laterally until it covered an area many miles in diameter, eventually permeating our observer area; the radioactivity in this dust cloud was said to be negligible.

The shock wave, arriving completely unannounced about forty seconds after zero, took most of us by surprise. It was a very sharp and sudden "blam!" rather than the deep rumbling we had expected. At our distance it was not strong enough to knock anybody over, but it startled many observers and stirred up a considerable amount of dust.

Mass Feeding

Now the mass feeding teams, which had been feeding us coffee and doughnuts all night, swung into action to feed us breakfast. These people, coming from all over the United States, were part of the Civil Defense Field Exercise group which was stationed at Mercury, Nevada. They also fed us a good substantial lunch on the following day on shot-plus-one tour of the forward area.

Hams in Forward Area

The group of volunteers who were stationed in the forward area 10,500 feet from ground zero joined us for breakfast. There were two amateurs among them (out of sixteen people) — W2TII, from Newark, N. Y., and W6LYF, from San Diego, Calif. They both appeared somewhat shaken up, but otherwise little the worse for their experience. Howard, W2TII, was left without appetite for breakfast, so we dined on one of the observer benches with W6LYF and had a very pleasant chat. Since then, we have asked both of them for a brief paragraph describing their experiences in the forward trench. Each supplied us with more than that, so we had to condense them to the following:

W2TII: "The most blinding light I ever saw, equal to 100 suns, was projected into the bottom of the trench. . . . I became conscious of the trench shaking from side to side. . . . Dirt fell in from the sides. . . . A terrific BANG split the air, seeming to come from everywhere overhead. . . . All sorts of debris was flying over our trench. . . . Then the command 'Out of the trench!' . . . Two of the Jeeps had their lights turned on

Part of the California Communications Caravan. Eight amateurs were in the crew of 25 who manned these units. The buses, completely equipped with spotlights, floodlights, p.a. system and multitudinous transmitting equipment (note the whips), were used for control purposes. Radio cars were assigned to c.d. service chiefs. All these units operated with the C.D. Field Exercises and were stationed at Mercury, Nevada.

by the blast. . . . As the base of the atomic cloud approached menacingly, we loaded into our Jeeps and got out of there." W2TII is RACES Radio Officer for Wayne County, N. Y. He carried a Gonset transmitter into the trench with him.

W6LYF: "'Shot' time found us kneeling in trench with fiber glass helmets, goggles and respirators in place, hands covering our eyes and hold-



W2TII and W6LYF, very much as they looked after emerging from the trench at 10,500 ft. from the shot tower. They were among 16 volunteers at that point.

ing our breath. Could see the light from shot through covering. Earth started to rumble (like an earthquake) and then came shock wave. Rocks and dirt fell into trench, then came the noise of the blast, loud and sharp. At shot plus fifteen seconds, we were standing in trench looking at the enormous cloud, brown with pink tints, rising before us. At shot plus five minutes we were in Jeeps headed for Media Hill six miles away and breakfast." W6LYF is Radio Chief for California Region 10 (San Diego and Imperial Counties). At Operation Cue, he was a member of the California communications team which provided communications for FCDA-sponsored field exercises before and after the shot.

Post-Shot Briefings

The day following the shot we made our last (sixth) trip to Yucca Flat, for most of us completing a total of over 1000 miles of travel in the buses provided. The purpose of this trip was to observe the destruction of "Doom Town" by the atomic blast. From a communications standpoint, let it be said that radio equipment stands up well under an atomic blast, provided it is not much closer than a mile from ground zero. Even then, if properly protected by shelters, it has a good chance of remaining in operating condition. A 250-watt broadcast transmitter installed in one of the steel-reinforced concrete block houses at the 4700-foot line was in actual operation on the Conelrad frequency of 1240 kc., using the call KO2XBM. This rig, sponsored by RETMA, was in operation until five minutes before the blast. After the blast it did not return to the air immediately, but the trouble was found to have been power failure; the equipment remained in operating condition and returned to the air shortly after the blast.

Other radio communications equipment in this and similar houses was found to be undamaged and still in working condition. Of the two towers closest to the blast, the guyed standard broadcast tower remained standing, although very slightly bowed. The unguyed 120-ft. tower had been broken off in the middle.

"Doom Town" had become "Survival City," but not everybody survived. "People" (mannequins, of course) in the open didn't have a chance, what with the combined effects of heat, radiation and blast, each lethal by itself. Those in the above-ground parts of the various houses were killed either by blast or missiles. Only those in basement shelters survived, although many were injured. Naturally, the closer to ground zero the greater the destruction. Normally-constructed houses 4700 ft. from ground zero were reduced to rubble, but the specially built concrete-and-steel block houses stood up well.

Amateurs in Field Exercises

There were a few amateurs in the observer and media groups, but most of them were amateurs incidental to some other capacity. The real communicating was done by the Field Exercise group stationed at Mercury, just a few miles from the shot area. This included amateurs belonging to the California communications team, which came

in convoy from Sacramento starting on April 17th, traveling via Los Angeles and picking up members along the way. Personnel in the convoy numbered about 25, including the following amateurs: W6s JN ASI RLB CIS LY CV OU and WYT. Equipment consisted of two completely-equipped communications buses and several cars (see cut) operating in the Disaster Communications Service (1761.5 kc.) and 47 Mc. During the period of the actual exercise, no amateur frequencies were used. One bus was stationed at the Observer Area on Media Hill, the other at field crew headquarters located approximately a mile forward.

The communications gang worked hard. The Field Exercises were no picnic. Troubles developed with the equipment (as they always do) necessitating long hours of trouble shooting. Some special communications arrangements had also to be set up, necessitating some equipment changes. Most of this work was done out in the open which, in the desert at that time of year, means a scorching sun and swirling dust during the day, penetrating cold dropping far below freezing at night.

W6CIS (ex ARRL Director, Pacific Division) received special permission from the AEC to use his call from one of the buses to keep in contact with home offices in California. He fired up one of the rigs using 813s running 250 watts to an 18-foot base-loaded whip mounted atop the bus. Power was supplied by a 3.5-kw. generator which is standard equipment on the buses. Much traffic was handled, with the assistance of many California amateurs, on the California Civil Defense Net frequency of 3501 kc. and other frequencies. This circuit came in mighty handy for getting word back home in lieu of the greatly-overtaxed telephone facilities through Las Vegas. In addition to personal traffic, much civil defense official traffic was also handled. W6CIS lists and wishes to thank the following stations for having assisted in keeping this traffic moving: W6s SWP BP SDR CLV EAR HOR ATO JGJ CJP IZG KB WR JDG CGQ JKW PQW IRJ KMJ, K6s JOQ DM HYT CB and K7FXS. W6JN did much of the operating from W6CIS/7.

* * *

We wish it were possible here to impart more fully to all readers the information picked up

(Continued on page 122)

A snapshot of the "shot" tower (background) from 4700 ft. away. Other installations in view are test installations. The 500-ft. tower was unguyed, 20' square at the base, equipped with elevator, cost about \$250,000. Nothing, but nothing, was left of it after the blast.

August 1955



QST—Volume IV

Part II†—1954 Supplement to the Foreword to the Index to Volume IV of QST

ONE of the puzzles which I have been unable to solve, from the data appearing in Volumes III, IV, and V of *QST*, is this: how many "tube" transmitters were actually in operation at amateur stations in the U. S. A. as of approximately July 1, 1921?

It finally occurred to me that it might be interesting to examine the published lists of "Calls Heard," from January, 1920 (when the first express reference to a "tube" set appeared in that department of the magazine), up to and including August, 1921, when the lists of stations heard during June, 1921, were published. Accordingly, I have done this; and I have separated from those lists the stations which various reporters identified as using c.w., i.c.w., buzzer-modulated telegraphy, and 'phone. To give the reader some sort of an idea of when each "tube" station first got into operation, I have also listed the issue and page of *QST* where its call was first published in "Calls Heard"; and I have identified the reporting station.¹

No attempt was made to follow possible changes from i.c.w. to c.w., or from c.w. to 'phone. I have simply listed the description of the type (or types) of transmission, as first reported in *QST*.

Unlike low-powered spark transmitters, v.t. rigs were potent distance-getters. Therefore, I believe that almost all of them were rather promptly reported in "Calls Heard." A possible exception would be the low-powered 'phone stations which would have little range; but I doubt if many such stations were in existence during the period studied.

The geographical distribution of these "tube" sets, as between the nine districts, is indicated by the list—to some extent, at least.

The totals are as follows:

Unlicensed.....	2
First District.....	93
Second District.....	158
Third District.....	45
Fourth District.....	11
Fifth District.....	9
Sixth District.....	28
Seventh District.....	7
Eighth District.....	126
Ninth District.....	52
Total.....	531

In addition, 5 Canadian v.t. stations were listed in "Calls Heard"; and 23 short-wave Army, Navy, commercial, or government v.t. stations appeared there.

† For previous installments see following *QST* references; Part I of "QST—Volume IV," July, 1955; "QST—Volume I," October, 1954; "QST—Volume II," February, 1955; Part I of "QST—Volume III," March, 1955; Part II of "QST—Volume III," April, 1955; Part III of "QST—Volume III," June, 1955.

¹ For absolute accuracy, it probably would be necessary

As will be seen by the second table, following the compilation of data from "Calls Heard," there were some additional v.t. stations not appearing in the published lists of "Calls Heard" which were referred to in the pages of *QST*, between January, 1920, and August, 1921. (January, 1920, is in Volume III; August, 1921, is in Volume V.) The "score" on these is as follows:

Unlicensed.....	1
First District.....	12
Second District.....	4
Third District.....	7
Fourth District.....	1
Fifth District.....	3
Sixth District.....	1
Seventh District.....	3
Eighth District.....	6
Ninth District.....	8
Total additional stations.....	46
(Including 2 not referred to by Call-Letters)	

In Canada, 3 additional v.t. stations are shown (including one which is referred to by the name of its owner and not by call letters).

These two lists (and the appended tables, which give details) demonstrate that at least 577 amateur v.t. transmitters had "come onto the air" in the U. S. A. by July 1, 1921. The question remains: how many more amateur v.t. installations were in the United States as of that same date?

I can only make a guess on this; and my best guess is: not over another 400—making a total for the United States, as of July 1, 1921, of 977 amateur v.t. stations.

As of June 30, 1921, the total number of all amateur stations licensed by the Department of Commerce had reached 10,809. See page 68 of *Two Hundred Meters and Down*, by the late Clinton B. De Soto, where it is said:

... The Department of Commerce reported 10,809 licensed amateur stations at the end of the fiscal year on June 30, 1921, an increase of 90 per cent. ...

If my guesses as to the numbers of licensed stations using "tube" transmitters, as of the two dates (July 1, 1920,² and July 1, 1921), are compared, it will be seen that the indicated increase, in the number of v.t. sets, 777 additional v.t. sets, is 388.5%.

I think that's "about right."

to check and re-check each list of "Calls Heard," and to transfer the items of information to punched cards; and to run the latter through an IBM tabulator. This I have not done; but I have tried very hard to avoid errors.

² It was "not over 200 stations," as of July 1, 1920. See "Foreword to the Index to Volume III," *QST* for March, 1955, page 51.

On the same premise, one amateur station in 28.59 had a "tube" transmitter as of July 1, 1920; and one amateur station in 11.06 had one, as of July 1, 1921.

Again, I think those figures are "about right."

Remember, please, that on the above subject I cannot offer proof. All I can do is to hazard an intelligent guess based on my recollection of actual operating conditions and on the data above set forth.

On another subject mentioned in my "Foreword to the Index to Volume IV of *QST*," I would also like to add a few words:

As to the short waves (meaning those below 200 meters) there is some later evidence showing that amateurs, in general, lacked proper receiving apparatus for picking them up; and which shows that this condition of affairs lasted for a considerable period of time. For instance:

In the May (1924) issue of *QST* (Volume VII), at page 10, Dr. A. Hoyt Taylor, Physicist, U.S.N., in his article called "The Navy's Work on Short Waves," stated as follows:

... Our interest in short waves is by no means a new one. Since 1917 one of the standard waves on board every battleship has been 150 meters. From a modern point of view the apparatus is pretty crude, being a peculiar type of spark set which is now of no particular interest; nevertheless occasionally extraordinary long distances were reached with it.

Had amateurs in the last few years had receivers capable of tuning down below 200 meters, we would doubtless have had a great many reports on our transmissions on 150 meters by these ships. Plans are now under way to replace this old equipment with modern tube sets of our own design. . . . [Italics added by S.B.Y.]

In Volume VI of *QST* I have also run across some additional material on early amateur work with small "tube" transmitters which was done for the purpose of QRM avoidance; and I would like to refer to it now:

At 12, March 1923, S. Kruse (Technical Editor of *QST*), in an article entitled "Exploring 100 Meters," described some preliminary experiments on waves about 170 meters long, as follows:

"... In the winter of 1920-21, mainly to get away from NSF's chopper and NAA's arc mush, we at Washington, D. C., began to feel our way downward. To our pleased surprise we found that our regular sets would work easily below 170 meters if anyone could be induced to get down and listen for them. A low-powered tube set in Washington and a

small spark-tube set in Hyattsville, Md., were able to work beautifully without any interference at all from NSF, NAA or anything else on any wavelength, although 3RP at Hyattsville was using only a Western Electric 'E' tube driven by a Ford spark coil. His signals at Washington (8 miles) were so intense that the phones were normally left on the table. The other station, 3ABI, was able to work ITS and 1QP whenever they could be induced to tune down — again there was no interference. . . .

To those readers who are interested to know what type of amateur short-wave work next followed the first "dips" below 200 meters (which were motivated by a desire to avoid interference), I strongly recommend close study of the balance of this same article by Mr. Kruse. It recites: the January (1922) tests of Mr. Boyd Phelps, at Minneapolis, Minnesota, on 100 meters; Phelps's later tests, in the spring of 1922 (after he had moved to Hartford, Connecticut, and had joined *QST*'s staff); the January (1923) tests between 9ZN and 1HX, 3XM, 1QP, 3ALN, 3JJ, 3APV, and the listening-station of Mr. A. L. Budlong (at Washington, D. C.); and also the February, 1923, tests between 3ALN, 1QP, and 9ZN.

Out of these experiments² an interesting fact emerged. On page 12, of the March, 1923, *QST*, Mr. Kruse stated it in these words:

... Why all these logs? For this reason — in every single test, with one solitary exception, the best signals were heard at some wave length below 170 meters. Even if we forget all about the decreased interference it is possible for us to move downward, work our antennas near their fundamentals (or below) and get better signals thru.

The early settlers have found the region of 100 meters good; they invite the amateur world as a whole to come along. . . .

As a first step toward stimulating general amateur interest in the wavelengths around 100 meters, the League's Traffic Manager, F. H. Schnell, announced "A 100-Meter CQ-Party," for the nights of March 24th and 25th, 1923. (See Volume VI, at 12 to 13, March 1923.) In addition, the following announcement was made by that official (see 13, March 1923, in Volume VI):

"... We are planning a system of short-wave test stations which will, at the same day and hour of each week, start at 200 meters and send tests down to 100 meters or lower. The schedule is not ready but will be broadcast on 200 meters on March 3rd and 10th by picked ARRL stations in each district,

(Continued on page 124)

² Mr. K. B. Warner interjected a somewhat critical note, re some of the experiments conducted by amateurs on waves between 80 and 135 meters, during the winter of 1922-1923. On this see his editorial, "A New Field," at 29 to 30, March 1923 (Volume VI). Here he said:

... Last winter considerable work on waves between 80 and 135 meters was done between some amateur stations in Boston, Hartford, and Pittsburgh, but the data seems to have become commercially interesting and the fellows in possession of it have shut up like clams and there is slight hope that those particular results will ever become available to us. As a result some of our own gang have determined to dig up the dope for themselves and the preliminary tests have been most encouraging. . . . [Italics added by S.B.Y.]

In the next paragraph of the same Editorial, Mr. Warner pointed out the freedom from interference which users of 100-meter waves were enjoying, and then referred to the added "bonus" of appreciable increase in radiation efficiency which had been experienced when the wavelength was shortened:

... Do you know that 100-meter transmission between Illinois and Connecticut is proving F.B.? It is! At the present time there is of course practically no QRM on such wave lengths except an occasional harmonic. That alone makes it worth while. There seems to be an appreciable increase in the efficiency of radiation as the wave length is dropped; and there is the 'kick' the experimenter gets in trying something new — and succeeding. . . . [Italics added by S.B.Y.]

Happenings of the Month

ELECTION NOTICE

To All Full Members of the American Radio Relay League Residing in the Atlantic, Canadian, Dakota, Delta, Great Lakes, Midwest, Pacific and Southeastern Divisions.

An election is about to be held in each of the above-mentioned divisions to choose both a director and a vice-director for the 1956-1957 term. These elections constitute an important part of the machinery of self-government of ARRL. They provide the constitutional opportunity for members to put the direction of their association in the hands of representatives of their own choosing. The election procedures are specified in the By-Laws. A copy of the Articles of Association and By-Laws will be mailed to any member upon request.

Nomination is by petition, which must reach the Headquarters by noon of September 20th. Nominating petitions are hereby solicited. Ten or more Full Members of the League residing in any one of the above-named divisions may join in nominating any eligible Full Member residing in that division as a candidate for director therefrom, or as a candidate for vice-director therefrom. No person may simultaneously be a candidate for both offices; if petitions are received naming the same candidate for both offices, his nomination will be deemed for director only and his nomination for vice-director will be void. Inasmuch as all the powers of the director are transferred to the vice-director in the event of the director's resignation or death or inability to

perform his duties, it is of as great importance to name a candidate for vice-director as it is for director. The following form for nomination is suggested:

Executive Committee

The American Radio Relay League

West Hartford 7, Conn.

We, the undersigned Full Members of the ARRL residing in the Division, hereby nominate of as a candidate for director; and we also nominate of as a candidate for vice-director; from this division for the 1956-1957 term.

(Signatures and addresses)

The signers must be Full Members in good standing. The nominee must be a Full Member and the holder of an amateur license, and must have been a member of the League for a continuous term of at least four years at the time of his election. No person is eligible who is commercially engaged in the manufacture, sale or rental of radio apparatus capable of being used in radio communications, or is commercially engaged in the publication of radio literature intended in whole or in part for consumption by radio amateurs.

All such petitions must be filed at the headquarters office of the League in West Hartford, Conn., by noon EDST of the 20th day of September, 1955. There is no limit to the number of petitions that may be filed on behalf of a given candidate but no member shall append his signature to more than one petition for the office of director and one petition for the office of vice-director. To be valid, a petition must have the signature of at least ten Full Members in good standing; that is to say, ten or more Full Members must join in executing a single document; a candidate is not nominated by one petition bearing six valid signatures and another bearing four. Petitioners are urged to have an ample number of signatures, since nominators are occasionally found not to be Full Members in good standing. It is not necessary that a petition name candidates both for director

(Continued on page 130)



Gov. William G. Stratton is shown signing into law the bill authorizing issuance of special call-letter license plates to amateurs in Illinois. Witnessing the happy moment are Hon. Paul Zemple, House of Representatives; Rev. Anthony T. Tamulis, W9POS; William P. Ingersoll, W9BHT; Ladd J. Smach, W9CYD; Tom G. Seese, W9LZ; Alex K. Scherer, W9EU; and Hon. Albert Scott, State Senator.



Gov. George W. Leader wields the pen in Pennsylvania. Participating in the ceremonies were Gilbert L. Crossley, W3YA, Atlantic Division Director; Rep. Albert S. Readinger; James F. Cochran, W3MLY; William T. Burton, Jr., W3ADF; Rep. Charles C. Smith; and James F. Marx, W3BN. W3RSB served as chairman of the committee but was in the hospital when the bill was signed.



Correspondence From Members-

The publishers of *QST* assume no responsibility for statements made herein by correspondents.

KA STATIONS

APO 343
San Francisco, Calif.

Editor, *QST*:

It has recently occurred to me that much misinformation exists regarding operation of amateur radio stations in the Far East. I am therefore taking the liberty of writing this letter in an effort to outline the operation of amateur radio stations by members of the United States Forces stationed in the Far East Command.

As you undoubtedly know, immediately subsequent to cessation of hostilities in this theater, operation of amateur radio stations in Japan and other portions of the theater was authorized by the Supreme Commander. These stations operated with the call sign prefix normally used by citizens of Japan (JA). When sovereign rights were restored to the Government of Japan, however, it was necessary that definite agreements between the United States and Japan be executed. The specific agreement which permits operation in the amateur bands in Japan is outlined in the Telecommunications-Electronics Agreement supplementing the Administrative Agreement under Article III of the Security Treaty between the United States and Japan.

It was agreed that the terms "amateur," "license," and "licensee" would not be used in describing privately owned stations operating in the amateur bands in Japan. These stations were known, instead, as Auxiliary Military Radio Stations (AMRS), and such stations were to operate with the call sign prefix "KA" rather than the "JA" previously authorized.

Operation of the amateur radio stations was to be regulated by such regulations and directives issued by the Commander in Chief, Far East, or his successor, as were required for orderly operation. One of the stipulations in this agreement was that Far East Command regulations would be in consonance with the Japanese rules and regulations governing their own amateur service. Specifically, the difference between the Japanese laws and those laws which govern operation of amateur radio stations in the United States were not very great. Up until recently, amateur radio stations operating in Japan operated under rules and regulations very similar to those of the Federal Communications Commission. Approximately eleven months ago, however, the Japanese Government pointed out that Japanese National amateurs are prohibited from handling third-party traffic; and since the United States had agreed to issue such rules and regulations as would be in consonance with the Japanese laws, the Japanese Government requested the Commander in Chief, Far East, to issue the necessary directive prohibiting the handling of third-party traffic by United States Forces personnel operating in Japan. Also, since Japanese law states that only the licensed operator of a station may operate the station, the United States was requested to prohibit the privilege of a non-licensed individual speaking over the microphone of an AMRS station.

Discussion and study of this proposal took some eleven months to complete. It was finally agreed, however, that the Japanese request was valid, inasmuch as the agreement specified above clearly stipulated that operation of United States Forces AMRS stations would be in consonance with operation of Japanese National amateur stations. It was therefore agreed that the United States would issue such directives as would be required to prohibit the handling of third party traffic by AMRS stations located in Japan. Since the agreement specified above did not include any territory outside of the Japan limits, operation of amateur stations in Okinawa was unaffected.

I have no doubt that some word of the third-party traffic prohibition has reached you, and I expect that some of the information you may have received has been garbled. I hope that I have been able to outline the present conditions under

which members of the United States Army Forces are able to enjoy their amateur privileges in this country, and hope that you may be able to afford some publicity to the capabilities and limitations of amateur operation in the Far East by such notices in *QST* as you deem appropriate. If I may be of any further assistance in providing you with other details, please advise me as soon as possible, and I will sincerely attempt to do so.

— Major August J. Sabel
Director of AMRS

MORE ON RAPP

8314 So. Langley Ave.
Chicago 19, Ill.

Editor, *QST*:

Thanks to W6TKA (June *QST*). He has presented a viewpoint concerning the Larson E. Rapp, WIOU, articles in which I concur. Be assured this is also the opinion of more of your readers than you may suspect.

Down with Rapp—there's already enough "April Fool" in the stuff I build!

— James A. Gundry, W9KNP

1311 N. Ode St.
Arlington, Va.

Editor, *QST*:

All this fuss over the article in the April, 1955, issue of *QST* has me worried. If this man's article is not true, does this mean that his other articles were not true, also?

I'm only a beginner at radio now (6 months), and about 3 months ago I was given past issues of *QST*. Naturally I read them by the hours, trying to learn as much as I could. But it just occurred to me that the article "The Double-Spectrum Theorem" (*QST*, April, 1952) probably is not true. If it was, why aren't we using it? An article appears in every April issue of *QST*. Why print it? You just waste space and confuse people.

— Charles Long, K4BND

3127 N. 17 Drive
Phoenix, Ariz.

Editor, *QST*:

The letters in June *QST* about your Rapp articles are enough to make one bury his head in his hands and cry like a baby. The human race *must* be more highly advanced than these indicate. Here's a vote for maintaining your work as before. Those articles were obviously hoaxes to me at the age of 14.

— Charles Fenswick, W7VMO

NEW SYMBOLS

1208 Jarvis Ave.
Chicago 26, Ill.

Editor, *QST*:

In case you are collecting opinions, I should like to add my vote of dissent to the new system of schematics. They impress me as being full of "hay" and hard to read, particularly the power socket and coaxial-cable designations.

— E. W. Williamson, W9ROE

Qtrs. I, Charleston Naval Shipyard
Charleston, S. C.

Editor, *QST*:

Here is my complaint to add to the many thousands I'm sure you have already received.

I do not (repeat, NOT) like the new wiring diagrams. After forty years' experience with the others, I'm sure I never will like 'em.

— G. L. Countryman, W3HH/4
Captain, USN

(Continued on page 136)

YL NEWS and VIEWS

BY ELEANOR WILSON,* W1QON

New Term for the YLRL

The new officers of the Young Ladies Radio League assumed their duties July 1st and will serve an 18-month term in order to put the club on a calendar year starting January 1, 1957.

President of the YLRL for 1955 and '56 is Alice "Cris" Bowlin, W9LOY, of Chicago, Ill.; YLRL chairman for the ninth district last year. Cris is one of the founders and a past-president of the LARK of Chicago. With her OM, W9RQF, she operates on 40 and 75 'phone.

Last year's publicity chairman became the V.P. for the new term. Also a past-president of the LARK, Gloria Matuska, W9YBC, of North Riverside, Ill., served with W6LBO as co-chairman of publicity for the First YLRL International Convention. The XYL of W9ATW, she is on 20 and 40 c.w. and 'phone. See her photo in the YL department of *QST* for Sept., 1954.

Marie Ellis, W9MMT, the new YLRL Secy.-Treas., is SEC for Colorado and assistant to ARRL Director W9IC, representing YLs in the Rocky Mountain Division. On 75 meters primarily, Marie is also Secy.-Treas. of the Trout Route Mike & Key Club of Ft. Collins.

Peg Ferber, W3RXV, of Slatington, Penna., continues for a second term as editor of *YL Harmonics*. Realizing her aims of a year ago, she

*YL Editor, *QST*. Please send all contributions to W1QON's home address: 318 Fisher St., Walpole, Mass.

The forty YLs who attended the 5th annual LARK Convention in Chicago May 20th thru 22nd voted to change the name of their annual meeting hereafter to Midwest YL Convention. Chairman Helen Boddy, W9BCA, announced that next year the affair will be held at St. Paul, Minnesota.



has effected a number of changes in the club paper. She works several bands with a Viking and is the XYL of W3RXW. See her photo in the YL department of *QST* for Sept., 1954.

The March, 1955, YL department carried a story and photograph of the new publicity chairman, Barbara Harrington, W1TRE, of Topsfield, Mass.

Because of a tie vote, ballots will be cast again for a chairman of the first district.

The other district chairmen follow:

K2IWO — Hilda Andrew; Newburgh, N. Y.; ex-W4HWR and D4AAB; licensed since 1941; XYL of W4EFG, Air Force chaplain.

W3TSC — Camille Hedges; Washington, D. C.; operates 40 c.w. daily; OM is W3BKE.

W4BLR — Katherine Anderson; Richmond, Va.; licensed less than two years ago. Kay already has several merit awards and contest certificates to her credit. Her photo appeared in "Results of the Novice Round-up — 1954," *QST* for June, 1954.

W5SYL — Iva Haley; Grand Prairie, Texas. XYL of W5MTQ; NCS of the K.L.R. Net for the past two years.

W6FEA — Gertrude Cassidy; Fresno; about to move to San Francisco; served as YLRL sixth district chairman in 1951 and '52; is V.P. of American Legion Amateur Radio Net; OM is W6WJF.

W7 — The chairman for the seventh district will be appointed by the president.

W8LGY — Ruth Rickett; Columbus, Ohio; on 3960 kc. daily; OM W8BTW.

W9AQB — Norma Courtney; Mishawaka, Ind.; had top score for her district in the last YLRL Anniversary Party; OM is W9AQA.

W0KJZ — Lydia Johnson; St. Paul, Minn.; operates "99 per cent c.w."; has Code Proficiency Certificate for 25 w.p.m.; busy on several traffic nets.

VE — The chairman for the VE districts will be appointed by the president.

KZ6LM — Lois Magner; Margarita, C. Z.

KH6AFC — Hazel Keefer; Honolulu.

As stated in the club constitution, the Young Ladies Radio League is an organization consisting solely of duly licensed women amateur radio operators. The aim of the YLRL is to further coöperation among members, to develop efficiency in radio operating, and to further the



W8LGY



W9LOY



W9AQB

interests of amateur radio in general. Organized in 1939 by Ethel Smith, W3MSU (then W7FWB), the current membership is close to six hundred. Any licensed woman amateur may join.

During the past term the club constitution and by-laws were revised for the second time (first revision in 1948). A second edition of the *YLRL Directory* was edited by Lenore Conn, W6NAZ, and the first YLRL International Convention was sponsored by the Los Angeles Young Ladies Radio Club.

The YLRL conducts two major contests annually — the YLRL Anniversary Party and the YL-OM Contest. It also conducts weekly nets on several bands. The net schedule for the new term will be published in this department.

YL Harmonics, a publication issued bi-monthly by the organization, gives the membership coverage of club activities and news.

There are three YLRL awards available to any licensed amateur — Worked All States-YL, YL Century Certificate, and Worked All Continents-YL.

YLS You May Have Worked

W1VXC — One of but a very few YLs in R. I., June Burkett of Rumford is PAM for her state. Traffic handling is June's favorite kind of operating. Her OM is W1OGT.

VE3DDA — From Brantford, Ont., Eleanor Elliot puts

out a good signal on 80 meters in spite of running only 12 watts to a home-brew rig. The OM is VE3BZP.

KN0AYQ — Only 8 years old, Bonnie Pass of Ladue, Mo., is giving her twin 14-year-old brothers, W9s MSA and MSB, competition on 40 c.w.

W9IMT — Elsenia "Red" Staleup of Bloomfield, Ind.; XYL of W9HSK. She operates on 75, 40 and 20. Red also holds a code proficiency certificate for 25 w.p.m.

W9RUJ — For 18 years Mary Meyer of Waukesha, Wisc., listened to the amateur frequencies before getting her own license in 1952. She uses a B&W 5100 on several bands.

W1WJA and **W1VVS** — Marjorie Bayer and Shirley Ailes are sisters living fifty miles apart in Vt. They deemed it less expensive to buy radio gear than to pay telephone bills. They are both readily available for Vt. contacts on 75.

W6QMO — Jeri Bey is president of the San Francisco YLRL unit. An OPS and BPL certificate holder, Jeri participates in a number of traffic nets.

W0MPB — Dot Breeden of Topeka, Kan., made some 1500 contacts in just a few months after obtaining her license in July, 1954. The XYL of W0LHX, she uses a home-built rig on several bands, 'phone and c.w.

VE2NJ — Nancy Jeary has been active since 1947. From her Greenfield Park, Que., QTH she can be found on 3785 kc. "at breakfast, lunch, and dinner time daily." Her OM is VE2OS.

WAS-YL Award

1) The Worked All States-YL award is available to all amateurs.

2) Two-way communications must be established on the amateur bands with all 48 states. Any and all amateur bands

(Continued on page 130)



W1WJA



W1VVS



W1VXC



VE3DDA



KN0AYQ



W0MPB



W9IMT



W6QMO



W9RUJ



VE2NJ



Hints and Kinks

For the Experimenter



PROTECTION FOR VOLT-OHM-MILLIAMMETERS

MANY of us who make frequent use of a general-purpose test meter will, at one time or another, inadvertently apply voltage to the terminals of an instrument having the function or selector switch set at the *ohms* position. This act of negligence may result in a burnt-out multiplier shunt, a new configuration for the pointer or even more serious damage to the meter movement.

The installation of a fuse as a preventive measure against this mistreatment of a meter is not always desirable or completely effective. The resistance of low-current fuses may not be too uniform and, in some cases, the resistance — whatever it happens to be — is great enough to affect the calibration of the *ohms* ranges of the instrument.

A more positive protection for a meter may be obtained by connecting a No. 14 flashlight lamp in series with the internal shunts. It has been determined that the resistance of these 2.5-volt 0.3-amp. bulbs checks consistently at very close to one ohm. Therefore, once the meter circuit has been modified to include a bulb, it is possible to make replacements in event of failure without concern over variations in calibration.

Fig. 1 shows how a No. 14 bulb has been connected into a typical general-purpose test meter.

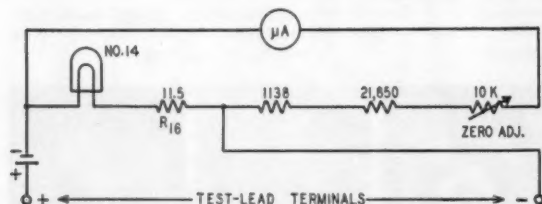


Fig. 1 — Protective arrangement for volt-ohm-milliammeters suggested by W9AFT.

The circuit and constants shown are for the popular Simpson type 260 meter. The 1-ohm resistance of the bulb is compensated for by removing approximately 2 inches of resistance wire from the 11.5-ohm shunt (R_{16} of the Simpson circuit). Usually, it is possible to find mounting space within the meter case for a socket for the bulb. This method of installation simplifies the changing of a burnt-out lamp.

Any voltage applied to the *ohms* terminals that is lower than the *burn-out* rating of the bulb will not cause damage to the meter shunts. At higher values of voltage, the bulb will burn

out even before the pointer can deflect to full scale. It should be pointed out that *all* resistance ranges of a circuit of the type shown are protected by this simple installation.

— Harlon Wright, W9AFT

IMPROVED BLEEDER CIRCUIT

THE arrangement shown in Fig. 2 provides a warning *before* the bleeder resistance burns out, and also a voltmeter for the output of a power supply.

The normal bleeder resistance is made up of two branches in parallel, each branch having

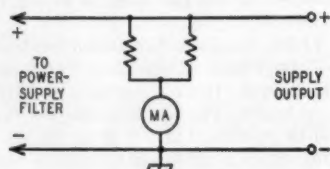


Fig. 2 — Schematic of the improved bleeder circuit.

twice the resistance of the normal bleeder. A milliammeter connected in the common negative leads reads the normal bleeder current. If one branch of the bleeder opens up, the other branch will still discharge the filter condensers, but the meter reading will fall to half its original value, warning the operator that one branch has burned out and should be replaced as soon as possible.

If the branches are made of equal resistance, each branch of the bleeder can have half the power rating of the normal bleeder. If, for example, the normal bleeder resistance is 25,000 ohms, 50 watts, each branch can be 50,000 ohms, 25 watts.

The output voltage of the supply can, of course, be determined easily by multiplying the current indicated by the milliammeter and the bleeder resistance in series with it. When the branches are equal, this resistance will be half the resistance of either branch.

Any milliammeter will read directly in voltage if the bleeder resistance is 10,000 ohms, or 100,000 ohms, the voltage being 10 or 100 times, respectively, the reading in milliamperes. A 25-ma. meter, for instance, will read 250 volts full scale with a 10,000-ohm bleeder, or 2500 volts with a 100,000-ohm bleeder.

— Rev. Joseph A. Terstegge, W9LQE

[Caution: The bleeder circuit becomes inoperative if the meter opens up! — Ed.]

The World Above 50 Mc.

1215-1300 2500-2450 3300-3200 5650-5925 10,000-10,500 21,000-22,000 50,000-9

CONDUCTED BY EDWARD P. TILTON, WHDQ

THERE are some 300 logs from the June V.H.F. Party already in the Communications Department files as we write, and with the reporting deadline still several days away more are arriving in every mail. A nationwide picture cannot be drawn at this time, so we will not attempt it until next month, but one thing is certain: the 6-meter band has staged a remarkable comeback. For the first time in several years, the downward trend of 6-meter participation in our contests has been reversed — and decisively.

Scattered through the correspondence accompanying the logs are frequent comments like "Sure glad to see the activity picking up on 6 again!" "Reminds me of '46, '47 and '48!" "Made 91 contacts on 6 this time, compared to an average of 40 in previous contests."

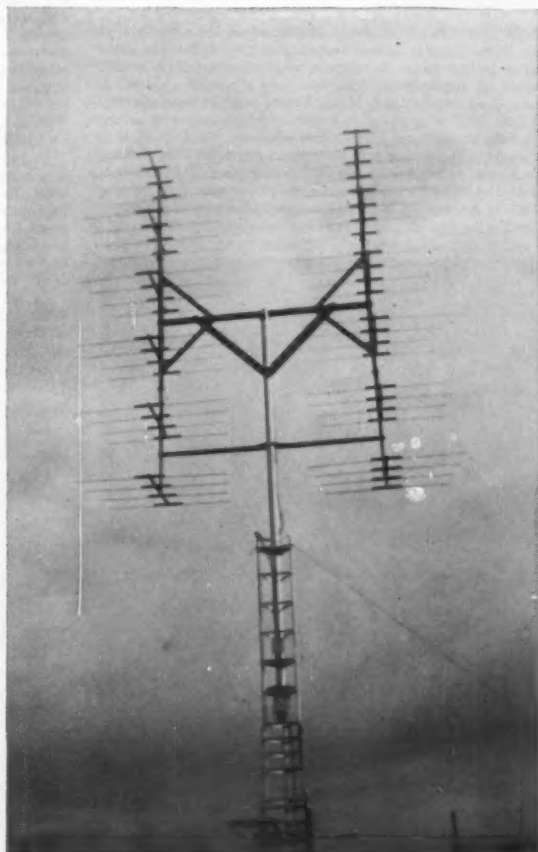
Obviously, the opening of the 50-Mc. band to Technician licensees couldn't have come at a more opportune time. The April 12th deadline gave the newcomers a running start on the 1955 sporadic-E DX season and, perhaps even more important, the knowledge that there would be some new calls on the band to work flushed out no small number of the old timers who used to be on 6, but have not bothered to get on recently.

Many fellows write that, for the first time in several years, they can now find something doing on 6 any evening, and occasionally during the daytime hours, too. It's certainly true in New England; we're not overwhelmed with QRM, by any means, but you can make casual contacts once again. When the band is open, states are heard that have been missing for the past two or three seasons. No longer is operation confined to the one "net night" each week.

This is all to the good, for 6 is too fine a territory to lie unused, DX season or any other time. Simple converters,

moderately-sized antenna systems, and transmitters that won't ruin the family budget provide consistent coverage that could easily take over much of the burden now carried by lower bands. Thousands of hams now knocking each other out (or trying to) in the turmoil between 3800 and 4000 kc. could work over much of the same territory on 50 Mc. with a fraction of the power — and no strife.

The 6-meter band is 20 times as wide as the 75-meter 'phone band, and as good or better, for distances up to at least 100 miles. On 6 you can use any mode of operation you like — c.w. a.m., f.m., teletype, s.s.b., duplex — with little or no worry about stepping on anyone else's toes. The static level is low most of the summer, and an ionospheric disturbance means DX, not a washed-out band.



The biggest 2-meter antenna? W7LHL, Seattle, Washington, has 96 elements. Each bay of this gigantic structure has two half waves in phase, with reflectors and directors. With a high-powered c.w. rig and a low-noise converter, W7LHL is loaded for bear.

The TVI threat, once considered an insurmountable obstacle in Channel 2 areas, is being licked. There are many ways to do it. W2IDZ showed some of them in June and July, 1954, *QST*, and the considerable nightly 6-meter activity now observed in Northern New Jersey is evidence that he knew what he was talking about. As far as the other channels are concerned, eliminating TVI with a 6-meter rig is no more of a problem than it is on any other ham band; in most cases it's easier on 6. A 50-Mc. "TVI Special" is undergoing final tests in the ARRL Lab, as we write. It will deliver a clean and husky 40 watts, and you'll not find it difficult or expensive to build.

The series of articles for the beginner just concluded in last month's *QST*, and many other *QST* features now on the way, will help the cause along. If you're the type that refuses to build his own gear, at long last some of our more enterprising manufacturers are bringing out some real 6-meter equipment. If you've always been going to give 6 a whirl, there'll never be a better time than now to get about it. Could be you'll like it!

W2UK Closes Down

To do an outstanding job in any phase of amateur radio requires a combination of the best in equipment and skill in operating that comes only from experience. Some of us have one of these attributes, but we miss the upper brackets of achievement in our chosen fields of endeavor for the lack of the other. This is no less true in v.h.f. work than in other kinds of hamming. A fellow who has ranked high in DX work, for instance, is likely to make a pretty good v.h.f. man, if he is thoroughly bitten by the bug. At least one did.

The thrill of working in a fast-developing branch of the art caught the fancy of Ralph E. Thomas, W2UK, back in the early '30s. DX men of the prewar era don't need to have his record recounted, but some of today's DX enthusiasts might be interested to see what one of the country's leading v.h.f. operators did before he began to burn up the 2-meter band.

We've just come out from under a pile of old *QST*'s with the following record of DX Contest participation by W2UK. In the first contest in which there was a scoring system, back in 1933, W2UK placed third in the N.Y.C.-L.I. section in a field of about 30. In 1934 he rated 14th in the country, second in his ARRL section. The year 1935 found W2UK up to 5th in the U.S. standing, with his countries total third in the nation. By 1936 Tommy was the top W2, landing in 3rd place in the national ranking. In 1937 he posted the country's top score in the c.w. competition and set a new countries-worked record with 71. His station, operated by another v.h.f. man to be, W2HNY, also made the top W2 score on 'phone. First place again, and another country record, 76, were achieved in 1938. The last DX contest of the prewar period found W2UK in third place nationally, just a whisker behind the two leaders, with 80 countries worked.

With this background, it is easy to see that W2UK was a sure bet to make his mark in v.h.f. work, once he tired of what he now calls the "d.e. bands." Tommy started in on 144 Mc. about five years ago with equipment not unlike that used by most 2-meter operators, then and now. His first 2-meter antenna was a 5-over-5, and his transmitter ran about 100 watts. He was just getting his feet wet taking a sampling to see if the 2-meter water was as fine as had been reported by some of his ham friends who were already in all over.

It was! Extended-range communication on a regular day-to-day basis was just getting under way on 144 Mc., and it appeared to W2UK, as to many of us, that pushing transmitter, receiver and antenna techniques to the limit would be bound to produce communication over distances then believed impossible on frequencies where ionospheric reflections were not involved. Before long the rig at New Brunswick, N. J., had been upped to a full kilowatt, and the antenna increased to 40 elements. Using c.w. mostly, and working in conjunction with W2AZL, W2NLY and others, Tommy was soon keeping reliable schedules on 2 at distances up to nearly 500 miles. His record of consistent schedules with W2ORI and W8WXV has never been equaled. And when the band was open, W2UK had a signal by which all other eastern stations were judged. By 1953, W2UK had assumed leadership of the W2s in states worked on 144 Mc., a position he shares today with two others.

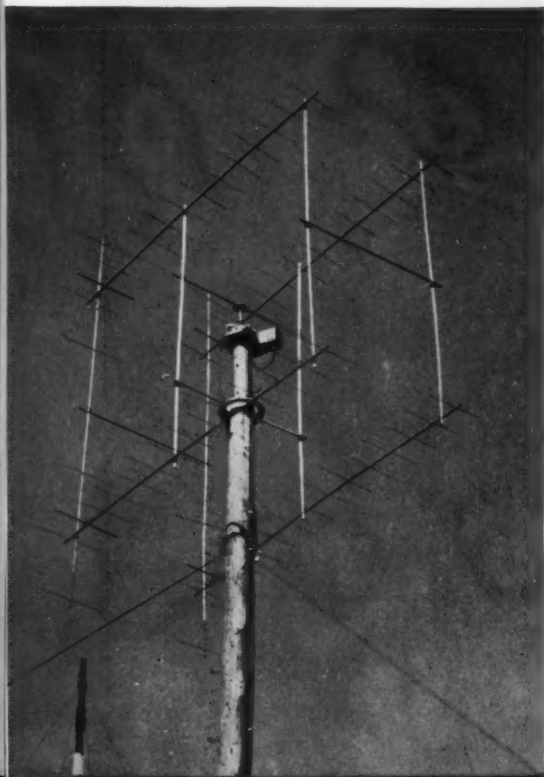
In June of 1953, W2UK began what turned out to be one of the outstanding amateur projects of a v.h.f. nature of all time, the observation and recording of meteor-scatter signals on 144 Mc. Working with W4HHK, Collierville, Tenn., he spent literally hundreds of hours keeping schedules at all hours of the day and night. This work, reported in detail in October, 1954, *QST*, resulted in widespread attention of the most favorable sort being focused on amateur radio.

In the course of their daily schedules, W4HHK and W2UK proved that meteor-reflected signals from distances of 1000 miles or more could be detected consistently, with the duration of signal bursts occasionally reaching proportions that permitted the exchange of useful information. This was opened to v.h.f. men a wholly new means of making distant contacts.

The W4HHK-W2UK schedules came to a close June 5th, after exactly two years of the most intensive kind of work it has been our pleasure to report. The June V.H.F. Party was W2UK's closing fling. Though busy preparing

One of the reasons for the outstanding 2-meter signal radiated by W2UK was this 64-element array atop an 85-foot pole. Four 16-element Yagis, stacked two wavelengths vertically and one wavelength horizontally, survived hurricane winds that wrecked many lesser antenna systems. Another 2-meter array at W2UK had eight 5-element Yagis spaced one wavelength in both dimensions, four bays high and two wide.

QST for



for his departure for KH6, he found time to work 127 stations in 19 ARRL sections on 144 Mc. for 2413 points. This section total is at least 5 better than anyone else in the country was able to do on 144 Mc., even working the whole contest period.

The famous station at New Brunswick is now dismantled, but much of it is on the way to Kahuku, on the north-eastern side of Oahu in the Hawaiian Islands, where Tommy will soon be taking up his new job with RCA Communications at their Kahuku transmitting station. Two-meter signals across the Pacific? We cannot escape the feeling that, if the job is to be done, here is the man to do it. One thing seems certain, at least: 2-meter interest, now just gaining a foothold in KH6-land, is due for a big boost. And while v.h.f. men everywhere will feel the loss of W2UK, they wait expectantly for 2-meter developments from Hawaii. Not the least of the possibilities: The same moon shines on both KH6 and W. 'Nuff sed!

National V.H.F. Calling Channels?

If you've done much mobile work on the v.h.f. bands, you've probably thought many times how nice it would be if we had some sort of national calling frequency for the 6- and 2-meter bands. There's little need for this in areas where v.h.f. activity is high, but it would be convenient, when traveling in the hinterlands, to be able to set one's receiver on an appointed channel and be sure of hearing a signal if there is one to be heard. The question is "What frequency?"

There was some attempt in the heyday of the RASO work on 6 to make 50.1 Mc. a national calling frequency. There are plenty of crystals (8350 kc.) for this frequency extant, and it gets quite a play when the band is open. Trouble is, no channel ever seems to be used as a calling frequency only, even on lower bands, where such things are supposed to be standard practice. Would v.h.f. men around the country use one frequency for calling and another for carrying on a contact, once made?

We doubt it, for long experience in such matters shows that only a very few ever know that the arrangement exists. Still, there's no harm in trying. Let's make it 50.1 Mc. for calling, unless someone has a better suggestion. (It would help if the "beacon" stations would scatter around a bit.) What will it be in the 2-meter band? Offhand, we'd suggest 144.6 Mc. This is a popular surplus-crystal spot, and out of the low-edge QRM area. Can anyone suggest a better channel? Thanks to W6BCX for bringing the matter up.

Here and There on the V.H.F. Bands

Expedition news that just missed last month's column: On May 28th, W6LIT and W6UID joined forces to provide Utah contacts on 144 Mc. for several W6s and W7s. They tried to reach Brianhead Mountain, an 11,315-foot elevation, but the road was still snowed in, so they had to settle for Zion Canyon View. This is a 9500-foot spot 18 miles east of Cedar City, Utah, and 45 miles north of the Utah-

Arizona border. Equipment was a 3E29 final stage, running 130 watts input on c.w., a crystal-controlled converter and BC-348 receiver, and an 8-element (W6GD type) horizontal array. Power was supplied by a gas-engine generator. Stations worked included W7VMP, Phoenix, Ariz., 300 miles, W7LEE, Parker, Ariz., 250 miles, and W6WSQ/6, 12 miles from his home in Pasadena, 375 miles.

The following morning they set up at Castle Cliff, a 3000-foot elevation about 7 miles inside the Utah boundary. Here they worked W6DNG, Compton, Calif., about 350 miles, and W6WSQ/6 again. W6DNG was the only home station worked in California, yet his signal peaked 87. The location of W6DNG is only 88 feet above sea level. W6NLZ was heard, but contact could not be completed. Polarization checks were made with W6WSQ/6, with no marked difference being observed between horizontal and vertical. A final stop at Wilson Pass, Nev., and several W6 contacts, completed the week end's work.

The W7VMP schedules, reported in May QST, have been kept regularly, but without significant results except with W5FAG, Albuquerque, N. Mex., and W6WSQ. These are mountainous paths of about 350 miles, in nearly opposite directions from Phoenix. W5FAG is heard on nearly every try, though two-way contacts have not been made regularly. W6WSQ is worked consistently, with barely-audible c.w. signals. Indications are that this path can be covered at just about any time, when high power, good receivers, large antennas and c.w. are employed. There are few rougher paths of 350 miles anywhere.

Perhaps the most pretentious v.h.f. expedition of all was just beginning to pay off as we write. W2QCY/7, complete with panel truck, a.c. generator, 45 watts output on 50 Mc., converter, receiver and beam antenna (not to mention low-frequency gear for liaison) was set up and ready for business at Wendover, Utah, June 22nd. Wendover being only 3 miles from the Nevada border, plans are to operate in both these rare states when the band is open. This trip of several thousand miles, months in the preparation stages, was made expressly for the purpose of providing eastern 6-meter men with a chance at Utah and Nevada, the two states now needed by just about everyone who lives east of the single-hop range.

The traditional late-June double-hop sessions produced hundreds of contacts for W2QCY/7, and for a similarly-equipped panel-truck station, W6ABN/7, Las Vegas, Nevada. Stan was busy for hours on June 26th, working W1s, 2s, 3s and 4s as fast as he could. We expect a flood of 50-Mc. WAS applications, as the result of the splendid job these two crews have done for the 6-meter gang. Those Nevada and Utah contacts have been a long time coming!

Interisland 2-meter contacts in KH6 are reported by KH6AED, Hawaii SCM. The first was made on the morning of June 5th, between the home station of KH6AED on Oahu, and KH6LD, mobile, on Maui. The latter was atop Lookout Point, a 10,000-foot elevation at the top of Haleakala, the volcano crater on Maui.

Ralph E. Thomas, W2UK, at the controls of his 2-meter station at New Brunswick, N. J. Equipment included a 144-Mc. crystal-controlled converter, working into a BC-342, left, for quick band-scanning, or into an SX-88 for weak-signal DX hunting. At the right is the kilowatt rig for 144 Mc. Similar shots of W2UK can be found in the DX Contest write-ups of pre-war QSTs.



Odd-propagation department: W2ALR, Lockport, N. Y., heard the 2-meter phone signal of W1DXE, West Hartford, 325 miles, during the widespread aurora of May 25th. There was only a slight rumble on the signal, and it was perfectly readable. This was about 8 p.m., when the c.w. signals from the aurora were at their peak strength. There was no evidence of a tropospheric opening at the time. Just a few nights previously, Larry heard a pronounced echo on the c.w. signal of W2UK, when he was in contact with W2ORL, Lockport. The delay was estimated at 50 milliseconds. Question is, where was W2UK's signal going to give it a 10,000-mile echo?

DX chances lost: On the morning of June 5th, your conductor heard the 50-Mc. signal of W6ABN for a period of an hour or more, rolling in about as well as we've ever heard a West Coast signal on 6. W6ABN was knocking off the W2s and 3s rapidly, but no W1s. How widespread the skip was at that time is seen from the TV DX observations of K6EDX, Fresno, Calif., for the same period. Bob reports

that between 0630 and 1430 PST he picked up Baltimore, Norfolk, Va., Tulsa, Philadelphia, Washington, New York, Chicago, Montpelier, Vt., Kansas City, Kalamazoo, Mich., Rochester, Great Bend, Kans., Omaha, Green Bay, Wisc., Wichita Falls, Texas, Spokane, Wash., and Great Falls, Mont., on TV channels 2 through 5! Sporadic-E skip begins on lower frequencies, and goes higher; that is, the 50-Mc. band is open before, during, and after the TV channels. There was quite a bit of DX worked on 6 at that period, but the stuff on the TV frequencies gives some idea of what 6 might have been like if we had activity over the country in anything approaching 75-meter proportions!

Horizontal Antennas for 2-Meter Mobile

In open country, at least, it's helpful to have the polarization matched between mobile and fixed stations. The general swing to horizontal has resulted in scores of ideas for horizontal mobile antennas. W2OW, Vestal, N. Y., has had fine results with a folded dipole taped to the rear window of his car. This can be fed with coax through a balun, or used with a balanced line. The dipole can be made of Twin-Lead, or of fine wire, the latter having the advantage of being almost invisible from even a short distance away from the car.

W9ULF, Oak Park, Ill., has a demountable set-up that has considerable merit. He cut a piece of 3/4-inch copper tubing one foot long, and bent it at the center so that when the lower portion is parallel to the door jamb of his car, the upper half is vertical. Two clips of thin sheet metal hold this tube in place, with self-tapping screws inserted into the door jamb. The copper tubing can be chromium plated, or painted to match the car, after which it is a nearly invisible socket for holding a removable mobile dipole.

The dipole itself consists of two 19-inch stiff wires, inserted in a triangular-shaped block of polystyrene. This mount is fitted over the top of a 1/4-inch aluminum rod 19 inches long, which is inserted into the socket when mobile work is in prospect. The dipole is fed with coax directly. A balun was tried, but with the short run of coax involved, it made no practical improvement in performance. The coax is 65 inches long.

If there is a tendency to rotation of the dipole when the car is moving, the vertical support can be wrapped in friction tape. Pushing it down in the socket tightly will hold it in position firmly.

OES Notes

W2UTH, Victor, N. Y. — Many new stations coming on 6, some at the expense of 220 and 420 Mc.

W3OTC, Silver Spring, Md. — Appearance of Technicians on 50 Mc. is the best thing that's happened to the band in many a year. A high percentage of DX stations worked appear to be newcomers, and activity is well above recent years.

W4KKK, Rome, Ga. — Have 807 working fine as straight-through amplifier on 50 Mc., driven by 12BH7 as push-push doubler. A pi network is used for interstage coupling, with a 20- μ fd. variable capacitor on the 12BH7 end of the coil and a 40- μ fd. fixed capacitor at the 807 grid. The coil is 7 turns, 1/2-inch diameter, 3/4 inch long. The 807 is mounted in a shield made from a small can of the frozen fruit juice variety. No socket is used, contact being made to the 807 with pins removed from an old wafer socket. The cathode pin and one heater pin are soldered to the can. The 807 plate tuning capacitor is a neutralizing unit from a BC-375. With the tube mounted horizontally, a short heavy lead connects from the capacitor to the 807 plate cap, and the plate coil is at the far end of the capacitor. The effectiveness of the by-pass at the cold end of the 807 plate coil was improved by enclosing it in sheet aluminum. The amplifier is completely stable at all settings of the tuning controls, and no parasitic chokes are needed. It runs nicely at 65 watts input, with 650 volts on the plate.

With phase modulation most Channel 2 TVI that developed with a.m. is cleared. The closest receivers can be handled nicely with a W2IDZ filter. See July, 1954, QST, page 33, for details.

W5FPB, Albuquerque, N. Mex. — New V.H.F. Club now officially organized, with W5FAG as president, W5VWU, vice president, W5FJE, secretary-treasurer, and W5ECS, activities manager. Working with local c.d. officials and

(Continued on page 128)

2-METER STANDINGS

Call	States	Areas	Miles	Call	States	Areas	Miles
W1RFU...19	7	1150		W6ZL...3	3	1400	
W1HDD...19	6	1020		W6RAZ...3	2	320	
W1CCH...17	5	670		W6NLZ...3	2	360	
W1IZY...16	6	750		W6MMU...3	2	240	
W1ULZ...16	6	680		W6CGG...2	2	210	
W1LEO...16	5	475		W6QAC...2	2	200	
W1KCS...16	5	600		W6EXH...2	2	193	
W1AZK...14	5	650					
W1MNF...14	5	600		W7WMP...5	3	417	
W1BCN...14	5	650		W7LE...4	2	247	
W1DJK...13	5	520		W7LZ...4	2	240	
W1MMN...10	5	520		W7YZU...3	2	240	
				W7JUO...3	2	140	
W2ORL...23	8	1000		W7RAP...2	1	165	
W2UK...23	7	1075					
W2NLY...23	7	1050		W8BFQ...29	8	850	
W2AZL...21	7	1050		W8WVX...28	8	1200	
W2QED...21	7	1020		W8WJC...25	8	775	
W2BLV...20	7	910		W8LPD...23	8	—	
W2OPQ...19	6	—		W8RMH...22	8	690	
W2DWJ...18	6	632		W8DX...22	7	675	
W2AOC...18	6	660		W8SRW...20	8	850	
W2UTH...16	7	880		W8SVI...20	7	670	
W2PAU...16	5	740		W8WEN...20	8	670	
W2PCQ...16	5	650		W8BAX...20	8	685	
W2LHI...16	5	550		W8JWV...18	8	650	
W2CFT...15	5	525		W8EP...18	7	800	
W2DFV...15	5	—		W2DFV...17	7	870	
W2AMJ...15	5	550		W8WWV...17	7	630	
W2QNZ...14	5	400		W8WSE...16	7	800	
W2BRV...14	5	590					
				W9EHX...24	7	725	
W3RUE...23	8	950		W9FVJ...23	8	850	
W3NKM...19	7	660		W9BFP...23	7	1000	
W3IBH...19	7	650		W9EQC...22	8	820	
W3BNC...18	7	750		W9KLR...21	7	690	
W3PPH...18	7	—		W9ULH...21	7	750	
W3TDF...18	6	720		W9ZHL...21	7	—	
W3KWL...16	7	720		W9KPS...19	7	660	
W3LNA...16	7	720		W9MUD...19	7	640	
W3GKP...15	6	800		W9REM...19	6	—	
				W9LFC...19	—	—	
W4HHK...26	8	1020		W9ALU...18	7	800	
W4AO...23	7	950		W9GAB...18	7	750	
W4PCT...20	8	—		W9JGA...18	6	720	
W4JFV...18	7	830		W9WOK...17	6	600	
W4MKJ...16	7	665		W9MBI...16	7	660	
W4UMF...15	6	600		W9BOV...15	6	—	
W4OXC...14	7	500		W9LEE...15	6	780	
W4JHC...14	5	720		W9DSP...15	6	760	
W4WCB...14	5	740		W9JNZ...15	6	560	
W4TCR...14	5	720		W9DDG...14	6	700	
W4UBY...14	5	435		W9PAN...14	7	680	
W4KZ...13	5	720		W9QKM...14	6	620	
W4JFU...13	5	720		W9JY...13	6	560	
W4TLV...13	5	700		W9ULA...12	7	540	
W4UDQ...11	5	850		W9ZAD...11	5	700	
W4ZBU...10	5	800		W9GTA...11	5	540	
W4WNH...10	4	500		W9JBF...10	5	760	
W4HJQ...10	4	500					
W4MDA...10	4	680		W9EMS...26	8	1175	
				W9IHD...24	7	870	
W5RCI...21	7	925		W9GUD...22	7	1065	
W5JTI...19	7	1000		W9ONQ...17	6	1090	
W5AJG...11	4	1260		W9DNI...14	6	830	
W5GNL...10	5	1400		W9OAC...13	6	725	
W5CVW...10	5	1180		W9TJF...13	4	—	
W5ABN...10	3	780		W9ZJB...12	7	1097	
W5MWW...9	4	570		W9WJG...11	5	760	
W5ML...9	3	700					
W5ERD...8	3	570		VE3AIB...20	8	890	
W5FEK...8	2	580		VE3DIR...19	7	790	
W5VX...7	4	—		VE3BQN...14	7	790	
W5VY...7	3	1200		VE3DER...13	7	800	
W5ONS...7	2	950		VE3BPB...13	6	715	
W5FSC...7	2	500		VE2OK...12	5	550	
				VE3AQG...11	7	800	
W6W8Q...5	3	1380		VE1QY...11	4	900	
W6DNG...4	2	350		VE7FY...2	1	365	

How's DX?

CONDUCTED BY ROD NEWKIRK,* W9BRD

Who's Where:

This being a prime vacation month we'll dispense with our usual abstruse DXhortation and choose instead to help beef up your DX reference library. Avid DXers en route DXCC haven't much time to sit around indexing their QST files and questions like "Now where did I see a picture of FG7XB?" often arise. So, as an excerpt from records that Jeeves maintains for our own convenience, here's a tabulation of photography that appeared in "How's DX?" over the past three years (asterisks denote equipment only):

1952

July: GM2DBX; PY2CK, W1ZD; VP5e BD BE BH BP; KW6AR.* August: AP2N, VU2DY; HZ1KE; MI3US ops. September: AC3PT; W1FH; VQ4ERR, ZS6Z, MI3US.* October: JA2KW ops; VK1BS; ZL1MP.* November: ZS6BW; PY2RT; KG4AF; DL4JN. December: DUICE; JA6AA; VP9OO; EA2a CA CQ; KA2KW.*

1953

January: HK ops; VP3LF; OX3SF; HB9GJ. February: IS1AHK; OE13JR; Mass. DXCC ops; PY1DD; TI2s BR DL PZ TY. March: CP1BX; 984AX; MP4KAC; KC6QL; ZS3G.* April: LZ1KAB; CT1CL; SM5s LI RM, 4X4BX; KB6AY*; KL7AFR. May: VK3HW; V89AW; ZM6AX; VP8AE*; JA1AH. June: CE3CB; KG6HL, W1FH, W6LW*; ZS2MI*; DL1EZ. July: PY2CK; YV5FL; ZL2AV; W1MCW; W2AOS/KG6. August: AC4YN; CR5AC; PY2CK*; CR6AI; KP4UB; VE8BV. September: LU4ZI; IT1TAI; SV0WG; YU1BCD. October: SM5KP; MP4BAF; PY4IE; KR6s LL LW; V86BE. November: HB1JJ/HE; FO8AI; KV4BB; HZ1AB ops; ZS6DW. December: ZL1HY; EA1AB; IIAOF; ON4NC; 4X4BR; DU7SV.

1954

January: JY1US; EA9DD; PY1AA ops, W3BSO. February: KJ6AY; ZE3JP; KF3AB; KH6MG; W1ATE; W9DXCC ops. March: FK8AB; OQ0FG; VS2DB; ZK1BG; SP2KAC*; G3IDC; OQ5NK. April: KG6AEX; KA0LJ; KA7RC; KX6BU; XE (LMRE) ops, W9AND; KR6s AZ BA IT. May: CR6CZ; KA2HQ ops; EA9s DE DF; ZL2JB. June: HH2OT; PZ1WX, W2BVS; VQ2W; CX5AF*; ZC4s CA FB GF JJ PB. July: NE1NMC; CT2AG; ZB2A.* August: Dayton Hamvention DXCC ops; GM8MN, W1 friends; TA3AA; HK1TH; HB1KB, HB9s KB RQ; VK9OK.* September: HZ1AF, W2ZXN; ZL1CI*; KL7PI. October: W6TI's QSL bureau; F8FW/FC, F9QV, HB9LA; GM3DHD. November: ZK1s AA AB BG BH BI; W2MHQ*; KA4MA, KA2DX, KA8AB; CN8MM. December: ON4VY; OQ5ZZ ops; MP4QAH*; EA6AW*; HK0AI.

1955

January: DU1CV; VE7ASL (ex-VR2CD); JA6AD; HB1MX/HE; YU1GM, OZ1FM, SV18P, G2MI, DL1DH, OE5HN. February: GB3NCB; VS6AE, W0YDZ; HB9X; CR8AB*; KC6KU. March: CT1CB; FB8BC; W0YDZ/KG6*; FG7XB; VE8s OG 8D SM YT ops. April: FP8AK/VP2, VP2VA; W2ZK, ZL2s ASL GO JF; DU6RG; K6EUV*; SM5ARL*; Famaagusta ZC4 ops. May: CN8ML; SM5RM; XZ2OM; HA5KBA.* June: G3AAT/OX; CR7CI; VP1GG; OY7ML.*

It's only fitting that we recap credits, too.

* Please mail all reports of DX activity to DX Editor Newkirk at 4128 North Tripp Ave., Chicago 41, Illinois.

Here are the guys and groups that were good enough to entertain you by the loan of those pix:

W1s APU FH NWO WTE, ARRL Hq. W1s, W2s AIS ESO HK HOB MUM TXB; W3s AXT VES/1; W4s BEW HYW TJI YZC; W5s KUC MIS UUK; W6s BES EAY GPB MUR YY; W8s IV SHW YJB; W9s BDW FKC HLF MQK RBI TRD; W0s AJL VFM, CT1CB, DU7SV, DL4LQ Gs 2MI 4ZU, HB9CZ, HE9RDX, KC4AB-W4QCW, KH6ALM, KL7AFR, LU5CK, VP3WO, YU1AD, ZS6BW, 984AX, No. Calif. DX Club, W. Gulf DX Club, Salt Creek Radio Club (W9AVJ), RSGB, USKA, National Geographic Society; Portland Oregonian and Chicago Tribune.

If, as the Chinese long ago put it, each pic is worth more than 10,000 words, these parties turned in plenty of DX column copy during those past 36 months. Our efforts to document doings in the DX world are greatly enhanced by such cooperation. A special salute to OT contributors *au fait* W6YY and W8IV who helped doll up three separate DX columns since July, 1952.

Incidentally, for the statistically inclined, it is of interest to note that a check with the ARRL DXCC Countries List reveals more than 100 countries represented in the preceding photo index. That's a fairly fast DXCC for your "How's" picture gallery!

What:

Time was when July and August were one-band months so far as the northern latitudes world of DX is concerned. The band, of course, was 20. Thanks to the happy acquirement of a 15-meter band and an assist from the valley of the solar cycle, North American amateurs now get hot-weather DXercise on a variety of frequencies. Hop on our "How's" Bandwagon and see for yourself, OM, bearing in mind that in the text to follow, frequencies (given in number of kc. above the lower band-limit) appear in parentheses, times without. E.g., (9) = 14,009 kc., if the paragraph deals with 20-meter work. Times are GMT, using the nearest whole-hour figure such as 7 for 0720 or 0650, 0 for 0015 or 2349. As a rule each DX call is mentioned but once per band.





SM2VP's Piteå, Sweden, hamshack displays a severe Scandinavian motif. An ARRL member since 1930, Helmer usually can be found on 14,080 kc. on week ends, with p.p. RK20As feeding a rhombic and other long-wire antennae. The receiver is an NC-183D.

20 'phone is a good starting pointing for our megacycling and W4CVX give us part of the reason why: **FP8AP**, **HC8GI** of the Galapagos, **HK9AI** (188) 16, **ODSAB** (121) 2-3, **TF2WAH** (130) 15, **VP5AE**, **ZB1AJX** and **ZB2A**. Tommy's new Telrex drove his 150-watter home to 70 fast A3 countries. **KG4AP** (W4DNE) ran down **DU7SV** (184) 14-15, **H16EC**, **KA6LJ** (190) 13 of Iwo Jima, **KG1AA** (240) 23, **VRs** 2AP (150) 4 and 3C **W9RBI**'s recent 60-minute 14-Mc. 'phone **WAC** — **ZS6QW**, **KA3JN**, **W3JNN**, **LU5XE**, **DL4RM** and **VK2AFS** — adds to the stack of evidence on hand indicating the early return of a more cooperative Kennelly-Heaviside stratum. **W7VMP**, whose two triplet brothers also have calls, forsook 144 Mc. in order to capture **DUIVVS** (170) 15, **FO8AK** (160) 1-3, **VR2s** CW 4, CZ 4, **VSs** ICZ 12 and 4CT (120-180) 14. Bob and **W9RBI** were among the fortunate to work **VS4CT** (G3DCT) as **VS6CT** before he shut down his Brunel installation in favor of Sarawak diggings. **VIUUS** (250) 13-15 continues to make friends and influence people. **KL7ZG**, **W6 GYY** **8YIN** 9FDX 9GPI 9RBI and 9WHM are included in the many who'll receive that Formosa QSL. **W9WHM** was the first Hoosier QSO for **KC6CG** (260) 9. John also contacted **FY7YE**, **KX6BU** (240) 7, **TA3US** (107) 22-3, while **Y13AM** and **YK1AE** escaped. **AP2U** 15, **JA6HK**, **LZ1KSA** 14, **OE13UA** 14, **ST2s** AM 17, **DB** 17, **SUICN** 20, **SV6WK** 16, **VS1FS** (111) 15 and **4S7MG** 13 vocalized with **HZ1AB**. **Scrumptious ACs** 3PT (114) 14 and **5SQ** (114) 14 raised the eyebrows of **W6YY**. **FO8AB** (30) 4, **OY2Z** (182) 19, **VK9RM** (164) 11, **VR6AC** (142) 2-4 and others are listed in the Milwaukee Radio Amateurs' Club DX newsletter. Northern and Southern California DX Clubs and the West Gulf DX Club list the following collection of 14-Mc. radiotelephones, the latter outfit contributing the lion's share: **DUIVCV** (189) 15, **ET2s** WS (173) 18, **XX** (184) 4, **FA3GZ** (136), **FB8AM**, **FO8AD** (30) 6, **GC6EQ** (166) 15, **GD2FRV** (140) 7, **HO1EH** (77) 1 — see "Whence", **HZ1s** AB (107) 0, **TA** (134) 0, **KC6AJ** (207) 11, **KG1s** BO (235) 3-4, **FR**, **KM6AX** (209) 6, **KR6s** KS (175) 13, **LJ** (121) 13, **NP** (175) 11-12, **PI** (175) 11-12, **MP4QAI** (143) 3, **ODSAD** (119) 3, **OK1MB** (138) 4, **OO5s** FO (131) 20, **PE** (131) 22, **SP5AH** (110) 12, **SV6s** WM (120) 19-20, **WS** (109) 4, **TF2WAG** (161) 15, **VK4IC** (132) 7 of Willis Ilet, **VK9s** GV (115) 7, **MX** (176) 7, **OK** (126) 6, **RH** (130) 2, **VOs** 4FK (115) 12, **SFS** (154) 20-21, **VR2s** AA (138) 16, **AM** (342) 5, **VS1s** AD (110) 15, **FJ** (180) 15, **FO** (109) 15-16, **FU** (180) 15, **GT** (161) 15, **EW** (232) 15, **VS2s** DB (187) 15, **DQ** (151) 15, **DS** (170) 16, **DT** (178) 15, **DY** (127) 14-15, **DZ** (170) 14-16, **EF** (249) 5, **VS6s** AE (101) 15, **BE** (111) 15, **CL** (110) 13, **CW** (170) 15, **VU2s** CT (137) 15, **ET** (187) 17, **FX** (122) 16-17, **YO3GM** (130) 2-3, **YU1GM** (150) 3, **ZD3BFC** (105) 18-19, **ZK1BI** (178) 16, **ZM6s** AR (152) 5, **AS** (160) 5, **AZ** (160) 5, **ZP5AY** (163) 0, **ZS3AB** (138) 18, **3V8s** AS (189) 3, **WK** (165) 6, **4S7SL** (167) 14, **4X4s** DK (150) 21, **FQ** (153) 4 and **5A4TU** (120) 20. 20-meter A3 vigilance by *Newark News Radio* Club vigilantes culminated in the logging of **C3VA** (205), **CPs** 4DF 5EK (160) 23, **CR6AF**, **CS3AC** (305) of Azores, **DUIAP**, **EA8s** 8BK 9AR (145), **9BC** 9BH (165) 21, **ET2AB**, **FASAG** (155) 7-8, **FM7WQ** (130), **FR7ZA** (115) 14-15, **H1IMX**, **HCs** 6CR 8HN (160) 3, **HHs** 2LR 2PB 3L, **HK6s** ES FI, **HR3HH**, **IT1BX**, **KC6UA**, **KG6s** AA NAA 3, **SB** of Saipan, **KH6AB** on French Frigate Shoals, **KR6s** AB AF AI 12, **DQ** NK OO PR TI USA, **KT1s** DD WX (210), **KV4AA**, **KW6BB**, **LX1DC** 22, **MP4NL**, **OQs** 5FN 0DZ, **TA1AL**, **TF2WAF** 22, **TC69s** KF (190), **RR** TU, **VK9DB**, **VPs** 1AB (185), **2DN** (140) 1, **2GW**, **7NI** 7NJ 7NS (145), **VR2AP**, **VO4s** EU FQ, **VSs** 1BA 2DC (184), **2UW** (190), **W6RJV**, **VEs** at Resolution Island, **Y12AM** 0, **YS1s** JR (195), **MS**, **ZB2A**, **ZD4s** BR BT, **ZM6AT** (160) 5-8, **ZS2MI** on Marion, **4S7YL**, **4X4s** BG 0, CR (185) 0, CX BG, **5As** 1TK 2TJ 23, 2TZ 23, **9S4s** AC (150) 22, AD 23 and BS (131) 0. Twenty-'phone WAC should be a snap with all these Japan actives specified available by NNRC: **JAs** 1ANR 1GV 1MP 1MR 1MT 3BB 4BB 4AH 5AF 6AA 6HK 8AA 9AA, **KAs** 2AC 2AJ 2CC 2CY 2EW 2FC 2GE 2IW 2JW 2KK 2NA 2OG 2OJ 2RM 2RR 2SM 2SV 2V8 2WV 2YA 3EB

20 c.w. deals them off the third or fourth layer and has many an ace up its raveled sleeve. With 250 watts on an 810 he's been using since 1938 **W9ELA** reeled in **MP4s** JO (40) 4, **QAL** (75) 3, **VQ6LQ** (66) 0, **YJ1DL** (6) 4, **ZD3s** 3A (60) 23 and **8AA** (4) 23. **W8YIN** got that **ZD3** as well as **ZM6AS** (68) 5. Mickey notes that **ZD3A** begins tuning 30 kc. below his frequency while the **ZM6** prefers calls 10 or 15 kc. higher than zero. **FK8AE** (65) 4, **FO8AK** (85) 2-3, **IIBNU** of Trieste, **JZ6PS** (34) 16, **SP9KAS** (44) 4-5, **VK9AU** (32) 12-13, **VRs** 2AB 3, **6AC**, **VU2AS** (16) 15, **9S4AX** (30) 15-16, **W7VMD/KG6** and **W6LKO/KG6** worked Arizona's **W7VMP**. **WIOJR** tangled with **FY7YE** (80) 22, **GD3s** 1BQ (60) 21, **IYS** (60) 22, **UB** (40) 16-17, **JA9BE** (55) 12, **KAs** 2CR (60) 12-13, **2OJ** (70) 13, **5HM** (82) 12, **SPs** 5AA (60) 20-21, **8KAF** (52) 1-2 and **SU1IC** (62) 2-3 who says he's the only legit Egyptian station active. **WIOJR** adds one **DXF-1** and another **ZP6CR** to the question-mark list. Vic pats gadabout **W6BYB** on the back for snappy Carribean-style DXtracurricular work at **FM7s** WD WF, **FY7YE**, **FG7XB**, etc. **W4QCW** (**KC4AB**) did all right on **KW6BB** (30) 13-17, **OY2Z** (51) 4-13, an **MP4**, **UQ2AN** (56) 12, **VK9OQ** (20) 7-12 and **VS6CG** (84) 14. Bob decries certain hogish members of the QRO contingent who must demonstrate how well they get out by repeatedly working a juicy one for the purposeless exchange of RSTs and inane clichés. **W9BZW** is a new customer who reports raising **EL2C** (68) 22, **FA9VN** (24) 0, **HK9AI** (53) 0, **OA4J** (87) 3 and **OK/YUs**. George measures his shorts 3-el. rotary at 5 db. forward and 25 db. front-to-back — not bad! **VP9BM**, of **WS0SL** and Turkey fame, clobbered **EA8** 9AP (61) 22, **9AC**, **FD8AC** (1) (63) 23-0, **FO8AB**, **HC1FG**, a Qatar **MP4**, **VK9DT**, **VU2RC** (57) 2, an **OY** and **4S7WP** (33) 4. Jules noticed that the **FD8** slipped and started to sign another call on come-back. **CO2YZ**, **KL7AON** and **3V8AN** (50) 21 are good catches from **HZ1AB**'s bailiwick. **W1WAI** got back in action for **CR4AF** (45) 23-1, **FG7XB** (91) 18, **ISLV** (88) 14-19, **KG1JB** (**W4KVM**) (66) 23, **LZ1KSI** (64) 22-23, **VQ5FS** (46) 19-22, **YO3RF** (75) 19, **3V8AB** (30) 22 and **4X4FK** (50) 0. Improved 14-Mc. conditions inspired **K6ENX** to trap East German **DM2ABK** (60) 6-7, **DUICV** (60) 15-16, **FY7YF** (5) 2, a Trieste II, **JZ6KS** (70) 17, **KG1AA** (40) 5, **VP1FL** (60) 15, **VP8BD** (50) 15, **VSs** 1GJ (55) 15-16, **IGL** (20) 15, **1GS** (90) 16, **2EM** (65) 15-16, **6CR** (80) 5, **VU2ET** (50) 13 and **4S7KH** (60) 15-16. **K2BZT** switched allegiance from 80 to 20 meters, and small wonder: **FB8As** (7) 17, **FB8AJ** (60) 21, **FO8AL** (39) 1, **GM3s** AIM (70) 22 and **GZA** (20) 1 of the Hebrides, **HA8s** 5BU (77) 23, **5KBB** (63) 23, **7OL** (17) 1, **JAs** 2CZ (68) 15, **3DY** (20) 14, **5AB** (50) 14, **7AD** (62) 13, **9CW** (85) 12, **Aaland** OH1s, **UA4KPA** (17) 20, **YO3RZ** (44) 21, one **ZAIKAD** (14) 23, **ZCAs** IP (10) 21, **VP** (70) 19, **4X4s** BR (85) 20, **BT** (80-95) 20, **FF** (92) 22, **FR** (90) 23, **IE** (49) 20-21 and aforementioned **EL** **FY7** 15 **LZ** **VQ6** **ZD3** items. Hayden is sporting Worked Vermont Certificate No. 43, "Which means they're a darned sight rarer than DXCCI". **ZD6BX** filed away **F9YF/FC** (31) 21, **FB8BR** (50-74) 13-14, **JA6s** BR CA 14, **KG6AFT** 14-15, **W6TMMX/KG6** 13, **TA3US**, **VK1VH** 7, **VS6s** AE (88) 13, **CW** (93) 13, **DB** DE (48) 13, **ZD9AB**, **ZP5EC** 15, **4S7NG** 13 and **9S4BN** 17. **W0VFM** caught **CN8ED** 21, **EA6AU** 21 of the Balearics, **HR1MC** 17 and **TF3AB**. At **W4YZC** we find the seals of **CX1FB** 23, **JA6s** AA HK 12, **LZ1KAB** (60) 2, **SV1SP** (19) 4-22, **ZC4GF** 20 and **4X4ED**. **K4ZDM** (10) 3, **KM6AX** (64) 3 and **KR6OO** (60) 4 came back to **W7UJL**. **W7TMI**, does a good job out in the DX badlands: **CN8EB** 3, **DM2ABL** 6, **FM7WP** 22, **JAs** 1ACA 7, **1GW** 9, **7DK** 6, **KA2GC** 8, **KJ6BH** (87) 3-4, **TF3ZM** 3, **VPs** 6KL 5, **7NZ** 1, **ZP5GM** 2, and **FG7** **FO8** II/Trieste **VS1** **V86** **YO** 984 trophies attend. **JA6AD**, who lends his communications talents to Nagasaki Radio, mentions working **EA9AB**, **MP4BBE**, **SU1SB**, **SVs** 1AB 9WR, **TF5TP**, **VQ8CB** (90) 16 and **ZD2HAH**. **W0UKG** scraped up **CETAK**, **HA5BI**, **LX1CW**, **SP9KAD** (40) 20-22, **Turks** **VP5s** **BM** (13) 19, **DC** (25) 2, **ZB1DK**, a **4X4** and suspect

3A2 to reach 128/117. **FB8XX, F08AA, LUIGC** and several U stations weren't having any. For a little DX excitement Doug digs into pile-ups with his 28-watt 2E26 exciter although the 813 stands by for rough going. . . . Seven short months on 20 c.w. resulted in 116 countries for K2GMO. Bob's latest successes include **CP5EP** (3) 21, **ET3LF** (35) 18, **FF8AC** (30) 20, **HA7KLA** (60) 18, **HE9LAA** (51) 21 of Liechtenstein, **HZ1HZ** (44) 20, an armful of JA/KAs, **KG6NAB** (62) 11, **OY7ML** (25) 20, **VP2GW** (87) 22, **VQ4FM** (10) 17, **4X4s** CK (25) 21 and **FQ** (44) 21. . . . **SP6WF, TF3KA, Y0SLD, YV3FS** and **5A4TK** are among W3UXX's shiny collection. Jon also bumped into 4X4CR/MM, Swiss Army station **HB4FE**, Swiss aircraft **HB1QN** and **K4ADG/AM** in a U. S. Navy blimp. . . . Gleanings from logs in this shack and that shack, at **W1YYM: VK9CB** (49) 13, **W6GVZ: Anander** OH1s, **V81 VQ5 VQ6**, suspect **PX1AA**, ditto **YA6s BBR GAL, W2TKG: YN1PM, HK0, K2BKU: EA9DF** 22, **K2EUH: HB1HT, KG1, KG4AB, PJ2JC, VP7NX, K2HZR: SL5AX** of the Swedish military. **W3TYW: IS1CXF, XE1H** for a fast QSL; needs dope on **W0WLO/SV2**. **W4TP: LAIRE**, who says **LB8YB** should be back at it from Spitiae by now. **W6CAY: DM2ADL, DU1CV, I1BLF** (50) 10 of Trieste, **JA1AH, OA8B, VEP8X, YN1KK, YV5AE, W5HIS: DU7, TI2CR; beard VR2AR** (5) 3, **W6NJU: Trieste, OE5BW, VR2BZ** (60) 6, a Thule **KG1, YU2GW, OH5NR/MM** off Ceylon. **W6QAR:** the preceding maritime-mobile OH5 who runs but 5 watts to a 25L6 final around 14,100 kc. **W6YY: KP6AK**, whose Palmyra QSL reads, "Population 1—Me." **W8BIQ: CR4AO, ET2MK, W6UWD: IT1AI, SV0WT** (80) 23, **DL2ZC: FR7ZA** 16, **UG6KAA** 12, **VK1EM** 17, **VK1AH** 16, one **ZA2B** 16-17, **ZD9AC** 18-19. **KL7BBF: F08AL, KC6AJ's** Heathkit 25-watter. . . . **WGDXC's DX Bulletin** supplies us with 14-Mc. c.w. notes on **AP2Y** (80) 1-2, **CRs** 4AL, 6CG (43) 22, 7AD (48) 13, 8AB (20-60) 2, 9AE (85) 7, 9AI, 10AN, CT3AB (32) 19, **FF8AP** (80) 1, **FK8s** AH (62) 4, AJ (9) 6, **FU8AA, FW8s** AA AB, **HB1RM** (50) 23, **IS1AHK** (3) 22, **KC6AI** (42) 5, **KR6s** AB (80) 18, AP (50) 11, LJ (40) 13, OL (55) 14, USA (10) 18, **KTIEXO** (46) 23-0, **LX1RB** (100) 15-16, **LZ1KAA** (70) 5, **SPs** IKA (80) 22, **2CI** (13) 0, **9KJ8** (57) 12, **ST2AC** (5) 23, **TF3MB** (10) 1, **VK9RM** (9) 13, **VP3YG** (2) 0, **V81s** BJ (81) 13, BL (48) 13, EI (94) 15, GI (32) 15, **V82s** CH (45) 16, CV (43) 15, DF (74) 1-2, DW (14) 15, EI (87) 15, EQ (70) 15-16, **V86s** CQ (22) 12, CT (15) 13, DC (2) 14, DD (3) 14, DE (2) 14, OD (52) 14, **V89AF** (34) 23, **VU2s** CY (50) 16, MA (60) 19, NR (50) 20, **Y0SAR** (56) 18, **ZC2s** 2PJ (81) 22, 3AC (74-80) 15, 4NFD (38) 20, **ZDs** 2WAF, 4AQ (50) 19, 6BX (73) 12, 6RM (64) 12, **ZK1AB**, one **3A2AM, 457GE** (70) 16, **4X4s** AE (64) 23 and II (40) 22. So much for the Hot Slot. . . .

15 c.w. DX possibilities are hailed by several Novices this month. **KN2KHZ's** Globe Scout, NC-98 and 70-foot wire had a hot time with **Gs** 5FA 0, 6RC 0, **GW3YR** 1, **KP4ZA** 0-1 and **LUIDFH** 2. . . . **KN4BBR** was delighted by **LUIEK's** reply. . . . **WN3ZKH** made it 17 countries on four continents by way of **DJ1VL, DL6s** GB KF, **DL7BA, F8TQ, G5CR, KG4AV, LU8** 7FAL **SDDH** 9DAZ, **OK1IH** and **YN1AA**. . . . Back with the General genre, **KR6LJ** enjoys 21-Mc. c.w. and writes of many European QSOs, **DM2ABL, FASRJ** and **JA1ACA**. Frank was intrigued to note that **DUTVS's** favorite frequencies, as listed recently in "How's", jibe precisely with his own. **KR6LJ** lays the blame on the oodles of war-surplus SCR-399 crystals kited scattered around the globe—even U.S.S.R. hams cluster 'round 7020 and 14,040 kc. . . . **VK2GW** and **VP9BL** make the 69th and 70th 15-meter c.w. countries for **W1CTW**. . . . **OA4C** 14-15, **PY7AN, SU1XZ/ZC4** 9-10, **V86s** AE CQ CZ, **Y03RF** 15 and **ZC4PB** 12 show up on **ZD6BX's** scorecard. Vic states that **ZS7C** still flits about 21-Mc. radiotelegraph frequencies now and again.

15 'phone is going great guns. **KL7ZG** recommends **CP5EK, OQ8DZ, VP5SC, VQ4EU, 4X4s** BD and BL to while away a Sunday afternoon. . . . **W7PEG** picked up **HC1RT, HR3HH, VK9DB** (350), **YV5AP** and heard the voice of **FM7WQ**. . . . **W6ZG**, with 70 countries on 21 Mc. and 63 of those via A3, lists **CE3QK, DL6TD, KP4WR, KV4BD**, several **KZss**, **YV5EW, ZLs**

As **VP8AQ** in the bleak South Shetlands, Graham Davis whiles away long off-duty hours through contacts with ham acquaintances around the world. **VP8AQ** employs an RCA rig running 350 watts (250 watts on 'phone), a Marconi CR-100 receiver and radiates with a 90-foot wire on 7, 14 and 21 Mc. CR-100s do ham-hand duty for many stations throughout the British Empire.

CAUTION

Under this country's treaty obligations and on formal notice received from other nations, FCC-licensed amateurs are warned to engage in no communications with stations in the countries listed below. This is in accordance with FCC Public Notice of December 21, 1950 (p. 23, Feb., 1951 QST), and as since revised.

French Indo-China (Cambodia, Laos and Vietnam), Republic of Indonesia, Iran, Korea, Thailand. Prefixes to be avoided: F1S-XW8-SW3, PK, ET-EQ, HL and HS.

280 4LA and these MMs: **Ws** 1Ks 10SF 1RZA 1UWV 30ZA and K2CIT. . . . **CT1OR, PZ1RM, ZB1CA** and sundry Europeans replied to **W4UWC**. . . . **W4NQM** has 95 ARRL DXCC Countries List items checked off on 15 'phone after four months. **E8L, FY7YE, GD3IBQ, VP3YG** and **ZD9AC** are among Sparky's incept. Friend **W4WVM** has 66 countries with a mere 35-watter and adds **KT1WX** and **YN1LB** to the 21-Mc. 'phone grab bag. . . . **CEs** 2BO 2DD 3CZ 31 6AB, **CN8s** CS GL (185), **CP5EQ/CP6, CR9AH, CT3AN** 19, **CXs** 2AX 2CO 5AF 8AA, **EAs** 8AI (150), 9BC, **FASRJ, FF8AP, HHs** 2W 2X 7W (W6-style), **HR1s** CB LW KS, **KV4BB, KW6BB, LX1BU** 22, **MP4KAC** 22, **OAs** 2A 5G, **OD5s** AG AJ, **OQ5s** BI RU, **TIs** 2BX 2VJ 3LA, **TG9AZ, SV0WO** 21, **VPs** 1EK 1SD (195), 2DN 2GE 4LL 4WL 5BD 5SC 6BS (198), 6FR 6GT 7NK 7NN 7NX, **YS1RA, ZC4JA, ZDs** 1SW 18-19, 4BK, **ZPs** 2CH 5CF 5GM 5IB (420) 22, 5IM, **4X4s** CX DK and 5A2CO are 15-meter radiotelephones spotted by NNRC's sharp ears.

40 c.w. gives a reasonable account of itself right through the thunderous season. **K6EC** recorded contacts with **CR7s** CI (16) 6, CN (5) 6, several **LUs**, **JZ8DN** (10) 14, **ZD6BX** (17) 16 and **ZE3JP** (18) 7. Shipboard ops **8Ms** 3AQD 6CWC and 7BHJ paid E a personal visit when their **SMS Adelsenabben** dropped anchor in San Diego. . . . **VQ2EW, ZE2JC, ZS7D** and **457NG** broke through the W/K barrage to **QSO ZD6BX** on 40. . . . 7-Mc. doings here and there, at **K2HZR: YASDA, TI2WR, XE1MJ, K2JKC: KG4AJ, KV4BK, VP7NM, YUIDYZ, W3TYW: LUIAP, ZE3, W6CAY: DUTVS** and others. **K8IDV:** one **CX1ADF** (4) 2-3, **W0VBS:** many **VKs** ZLs, **CE7ZJ** (5), **LUs** **W7AMX: YJ1DL** (8), **KL7BBV: F08AL** on Tubuai.

This is the slack season for 28- and 3.5-Mc. work but **W2QHH** reports catching **VK9RH** on 80 for his No. 113 on the band. . . . NNRC constituents logged **GT1PK, CX2CL, DJ2KG, DLs** 4DS 6VM, **EA7DL, F8PQ, H1TH, JA1s** AGU AI, **KZ5s** galore, **LUs** likewise, **OEIFF, PJ2s** AC AP, **TI3LA, VPs** 7NJ 9AY and **4X4ADK** sneaking through on 10 'phone during brief openings. . . . Forty 'phone produced NNRC SWL cards en route **VK2s** AFC **AFF** AIO ALL AQ AQF AVJ JN LF LY PC SA SF WA, **VK3s** AAO ABI ALA AOQ ASD ASF HK QP XI, **VK4s** AI AO AR BW CP DJ FT IT JR LL MO PR QR TK TS WI WR YI ZB ZM, **VK5s** JO NM RR SR, **JA1s** AGU AI ALR and JS. Forty A3 has large crews performing Down Under and Up Over but the two groups seem to have an awful time getting together!

Where:

W1WY receives assurance from ex-**VK1AC**, now **VK3IB**, that all **VK1AC** Macquarie QSOs will be confirmed. Chas. has been setting up housekeeping at the QTH to follow—patience, please. . . . **W4BRB** wants it understood that at present he handles QSLs for no DX stations, despite recent rumors to the contrary. "When I do so I will advise in advance and in the legitimate manner." As we phrase these lines there are about six highly unusual call signs being bruited about on DX bands. Until somebody sees the color of their QSLs there's little logic in wasting much speculative space on them because there is already on hand a surfeit of solid, albeit less sensational, DX information to





An HT-9 rig and SX-71 inhaler are the nucleus of the layout with which KC6ZB passes out Yap Island QSOs on 14-Mc. 'phone. Ralph is on 20 almost daily and throws a stout signal Statesward with either a 3-element rotary beam or Vee array. (Photo via KC6AA)

disseminate. Suffice it to say that W6GAL, W3GRF, W4QV and W4BRB can't help you out with YA6GAL, 4WIAR, H18EW and PX1AA-4WIAB, respectively. . . . Reference the QSL-VP7NX-via-W3VRM aqub in our May effort, ex-W8VRM (now W4FQ) points out that this is true only for about 300 QSOs dating between July, 1953, through January, '54. For obscure purposes of bookkeeping long incomprehensible to Jeeves, certain licensing authorities deem it necessary to issue almost immediately a given call sign to successively different holders. In view of the importance of amateur radio's QSL tradition it should be obvious that such switching of call signs easily makes for confusion and the possible besmirching of innocent reputations. Two years doesn't seem an unreasonable length of time for a second-hand call sign to lie in abeyance while time dissociates it from the identity of its last previous owner. . . . W4QCW recommends that those still shy ZC7DO pasteboards reapply to G4CP. . . . Stamped self-addressed envelopes are required if you accept the offers of W4ML and W5BNO to assist with FY7YE and VQ6LQ QSL matters, respectively. W5BNO's VQ6LQ logs date no earlier than May 1st of this year. . . . W6OUN earns a vote of thanks for turning out QSL stock for HK6AI, VQ6LQ, ZD6BX, YN4CB and others. Bill's homemade photo-process products are expediting rare confirmations for hundreds. . . . W6SYG, handling current QSL matters for VR6AC, will use bureau paths unless applications are accompanied by a.s.a. envelopes. . . . IIBNU of Trieste advises that the last published listing of Trieste *Call Book* addresses should be consulted while Italian licensing revisions are being completed. Likewise, then, for stations in Sardinia and Italy proper. . . . From HZ1AB: "Our QSL situation has been alleviated by the use of one of the Mimeograph machines on the base. . . . We are all caught up now and are QSLing exclusively through the bureaus. As soon as things slow down a bit, cards will be sent direct." Incidentally, HZ1AB makes use of U. S. postage. Operator W6CRV awaits reassignment and probably will draw a post in Europe. . . . For scaring up the following individual items, all hail W1s OIG OJR RDV TYQ UED VG WAI WFO WPR WY ZDP, W2BVS, W3WPG, W4s TEB YZC, W5FXN, W6s NJU UED ZZ, K6DBV, W8KAK, W9CFT, W9s CPM VFM, DL4ZC, KL7BBV, ZD6BX, NCDXC, NNRC, SCDXC and WGDXC:

AC3SQ (QSL via VU2JP) CE7ZJ (QSL via RCB) CR6AJ, A. dos Santos, P.O. Box 244, Nova Lisboa, Angola CR7CI, A. L. Figueiredo, Aeroporto DETA, P.O. Box 276, Lourenco Marques, Mozambique CR7DK, Post Box 29, Mutarara (Beira), Mozambique CX2CF, P. R. Pomeroy, Juan M. Perez 6027, Montevideo, Uruguay CX7CO, D. S. Arroqui, Ramon Anador 3108, Apao, Montevideo, Uruguay DU7SV, V. Sotto, National Radio School, Cebu City - Philippines EA9DP, A. Perez Real, Box 213, Mellilla, Spanish Morocco EL2C, % PAA, Roberts Field, Liberia (or via W1JOJ) EL2P, Les Hibbert, PAA, Roberts Field, Liberia ex-ET3S, VE3RE, Box 320, Waterford, Ontario, Canada HB1s GW IV MO (QSL via USKA) HPIEH, Louis Decatrel, Box 189, Panama City, Panama HR3HH, H. J. Holler, % Standard Fruit Co., Coyoles, Honduras IIBNU, F. de Gironcoli, via F. Venezian 5, Trieste ICWZ, Mario Gignanti, Viale Regina Margherita 30, Milan, Italy JAIATF (QSL via JARL) JZ9PS, Box 52, Hollandia, Netherlands New Guinea KA2KS, Box 31, Navy 830, FPO, San Francisco, Calif. KC6DC, Duane E. Clymer,

Koror, Western Caroline Islands KC6EE, Elmer E. Comstock, USCG Depot, Box 1, FPO 926, San Francisco, Calif. KC6SP, USCG LORSTA Anguar, USCG Depot, Box 1, FPO 926, San Francisco, Calif. KG1BO, BMS 6607, AB Wing, APO 23, New York, N. Y. KG1FR, 2004th AACB Sqn., APO 121, New York, N. Y. KG1JB, J. Barrett (W4KVM), % 1935th AACB Sqn., APO 858, New York, N. Y. KJ6BG, Warren D. Kirk, Box 441, APO 105, San Francisco, Calif. KL7BBY, F. Templin, Box 333, APO 942, Seattle, Wash. ex-KS4AW, W. F. Hancock, P.O. Box 26, Opalocka, Fla. KX6BL, L. H. Wells, APO 824, San Francisco, Calif. KX6BM, L. C. Kelsey, APO 824, San Francisco, Calif. LU8ZS, J. P. Sorochar, Destacamento Naval Luna, Islas Shetland del Sur, South Shetland Islands MP4NL, Box 40, Bahrain Island, Persian Gulf ex-MP4OAJ, R. Rimmer, G3KCE, 29 Kirkless Rd., Southport, Lancs., England OQ5PU, Box 1945, Elizabethville, Belgian Congo OX3UD, Angmagssauk, Greenland SV0WT, V. T. Sparacine, 7954th Army Unit, JUSMAGG, APO 206, New York, N. Y. TF2WAH, 932nd AC&W Sqn., APO 81, New York, N. Y. UA4KPA, Box 74, Odessa, Ukraine, U.S.S.R. ex-VK1AC, VK3IB, 75 Lloyd St., Dimboola, Vic., Australia ex-VK1BA, B. Fiebig, 48 Blackburn St., Maddington, W.A., Australia VP6AC, A.D.A. Cottingham, Tara, Garden Gap, Worthing, Ch., Barbados VP6AG, A. G. Streat, Bloomsbury, St. Thomas, Barbados VP6BG, F. Lashley, Retreat, Gun Hill, St. George, Barbados VP6BO, Jeanne M. Sugars, Chelthorne, Chelsea Gardens, St. Michael, Barbados VP6PG, P. G. Wallbridge, Ladymeade, Gardens, St. Michael, Barbados VP6WR, W. A. Richardson, Wendmar, Flinthall, St. Michael, Barbados ex-VQ3EO, P. Stein, % Macalder Nyanza Mines, Private Bag, Kisumu, Kenya VQ5EL, Box 60, Kampala, Uganda VQ5FS (El9G) Box 118, Jinja, Uganda VQ6LQ (QSL via W5BNO - see preceding text) VQ8AG, Frank McLaughran, 180 Route Royale, Beau Bassin, Mauritius VR6AC (QSL via W6SYG - see preceding text) VSIAD, E. C. Yates, P.O. Box 564, Singapore, Malaysia ex-VS1BQ (QSL to DL2TH) VS1EW, P.O. Box 158, Singapore, Malaysia ex-VS5KU (QSL to G2KU) VU2CY, Colin Young, P.O. Box 150, Calcutta, India YU2IP, Jelencic, U. Rade Koncar, 183, Zagreb V, Yugoslavia YV9AP (QSL to YV5AP) ZC2PJ, P. J. Reeves, Direction Island, Cocos-Keeling Group, Indian Ocean (QSL via MARTS) ZD6RM, R. MacFarlane (GM3EAK), % Postmaster, Blantyre, Nyasaland ZS1PD/ZS8 (QSL to ZS1PD) 5A4TZ, P.O. Box 372, Tripoli, Libya.

Whence:

Asia - AC5SQ puts virgin ARRL DXCC Countries List territory on the air after a move of 70 miles from his AC3SQ shack. This from VS1CZ via W6YY - how rare can a guy get? Further Asia gleanings courtesy W6YY: The first few weeks of BV1US (Formosa) activity produced over a thousand contacts with 50 countries. . . . A handy marker station for 20-meter break-throughs to Asia is Hong Kong Cable & Wireless on 14.283 kc.; a female voice, usually modulates. . . . VS2DQ, long a reliable source of Far East info, isn't expected back from Europe till next year. . . . Reminder: KAs must turn down 3rd-party traffic as of early June. . . . From W1s BDI RGY and others we're glad to hear that ex-AC4RF finally pierced the bamboo curtain. Bob had been imprisoned by Chinese Reds since the fall of Tibet in 1950. . . . WIUED advises that would-be ham Vajapeyam Shankar Marayan Sri Nrusimha Vivas, No. D.84/839, 3rd Crossroad, Srirampuram, Bangalore 3, South India, desires correspondence with U. S. amateurs. . . . JAIATF, probably the dean of Japanese amateurs, operated under prewar call signs J2PS, J7CG, MX3H and AC4TF. . . . Those seeking more DX-award wallpaper should write JAIUY with reference to a certificate offered by the Sugimani Radio Club of Tokyo. So advises K6DV via W1QON. . . . W6CRV of HZ1AB says incoming a.s.b. signals cut 20-meter QRM like a hot knife through butter, but he has difficulty getting the local talent to tune for it properly. . . . In an interview with WGDXC newshawks VS2DW reports that a DX-station operator's pet dreams are WAS and a 60-QSOs-per-hour Test average. [How about an automatic QSL machine, Boss? A gadget that checks the log, prints the cards, makes them out, stamps them (free), signs them and mails them via rocket express! - Jeeves.] VS2DW keeps in touch with his 14-Mc. public by way of a modified BC-610E, HRO-M and dipole.

Africa - "I wish to inform you that I am going to Basutoland during August this year. I will be operating on 7 and 14 Mc. from about the 8th to 29th under the call sign ZS1PD/ZS8. I tried very hard to get a ZS8 call but was refused. The operating times will be approximately as follows: 7 Mc. from 2200 to 0600 GMT with a two- or three-hour break for sleep; 14 Mc. from 0800 to 1930 GMT. I will operate c.w. only, using 50 watts to 807s with ground-

plane antennas on both hands." This from ZS1PD who has accumulated some 103 countries at his Strand home station. . . . ZD6BX reports that ZD6RM (GM3EAK) is helping to pass out Nyasaland QSOs with a will. "ZD6EF also is going strong with an 813 and long-wire on 14 and 21 Mc. He has clamp-tube modulated 'phone. . . . I am toying with the idea of a trip to the Aldabra Islands but obstacles are terrific! I could manage two weeks' leave for the project and I have suitable gear but the big thing is getting there. I'll do my best!" Vic closes in on the 100-confirmed mark and reports good results feeding each of his ground-planes with two sections of paralleled 75-ohm coax. . . . ZS6VA is receiving QSLs from some unfortunate individuals who worked an n.g. ZS6VA out KH6-W6 way. —ZS1IR . . . WGDXC Africano-grams: SV8WK departed from Greece to try ham conditions in Egypt. . . . EL2X visited Stateside and may become a W2 or K2. . . . CN8MM mentions the activity of FB8AM on Amsterdam Isle. . . . VQ5FS expects to be active in Uganda for several years and has a sharp collinear array focused on his native Eire (one way to minimize W/K interference!).

Oceania — W6YY's voluminous Oceanic notes make interesting excerpt: ZC2PJ writes, "Regret I'm only transient here. Returning to Ceylon in August. Hope to see you from 48T [with my 75-watt 807s rig]. Hope my relief here will take a rig so that ZC2 is still on the air. Haven't heard any ZC3s in a long time." . . . VR6AC, located on the northeast coast of Pitcairn with a 1000-foot mountain reflector behind him, expects to be active several times weekly for North American contacts. When not on the air he charges his batteries anew. . . . VS4CT closed down VS5CT in late May after 942 Brunei QSOs that included contacts with 28 states. After a few Sarawacky months he'll probably return to Brunei or try his hand at ZC5 work.

The freshly available WIA (Australia) WAVKCA award is based on obtaining 21 QSLs, these to include one from any VK1, one from any VK9, one from Northern Territory (VK5 prefix), and three each from VK2 VK3 VK4 VK5 (South Australia), VK6 and VK7. Write WIA at Box 2611W, GPO, Melbourne C1, for full details before applying. Finding one of those Northern Territory VK5s should keep you busy for awhile! . . . Norfolk's VK9RH usually hits his DX on week ends from 0400 to 0600 GMT, 40 and 20. . . . In the 1954 VK/ZL Test ZLIAH and VK2GW copped c.w. honors; ZL1MQ and VK2AHH cleaned up on 'phone. Peak scorers for their respective U. S. call areas were Ws 1RWP 2WZ 3VKD 4KVV 5HVR 6MVQ 7PQE 8JIN 9ABA and 9RSL. W6YY topped the North American field on voice. The 1955 VK/ZL affair is coming fast upon us, incidentally. October's the month!

W7HXG, we learn from W1WPO, was VR6AC's first A3 QSO since prewar days. VR6s AW and AY, though still on the island, remain inactive hamwise. VR6AC had difficulties in getting out until he tried W6MUR's suggestion and cut off some flat-top. . . . Ham and tropical paradise at KC6AA of Yap Isle: Viking I, 8X-88, HQ-140X, 75A-3, and two long-wires 90 feet high, one of which is 1200 feet long and traverses a lagoon overlooked by the shack. . . . VK3IB, ex-VK1AC, toils at Victoria b.c. station 38H when not working on his Macquarie QSL backlog. . . . VR2BZ retired from RNZAF duties and no longer traipses over to the Tokelous area.

Europe — EDR (Denmark) has modified its OZ-CCA award rules so that amateurs outside Scandinavia won't find it such an impossible nut to crack. Write the society's Traffic Department, Diploma Section, P.O. Box 335, Aalborg, for the revised specs. . . . Early this month HB1s IV and MO (c.w.) and HB1GW ('phone) will fire up on 5000-foot Mt. Rigi, Schwyz canton, on 80, 40, 20, 15 and 2 meters. "We would be glad to meet many American stations and will listen and call each evening beginning 2100 GMT." Their climb is sponsored by the Lucerne section of USKA. . . . Attention is called to the Swiss S.W. Service's amateur DX programs broadcast by beam to North America on 6165, 9535 and 11,865 kc. each first Friday (Thursday night in U. S. A.) of every month at 0150 and 0435 GMT. HB9s CZ GI and HE9RDX are emcees. . . . Dates specified last month for the DARC (Germany) WAEDC contest are valid. This world-wide DX test is the postwar version of the old DJDC affairs and should be a real whingding. Make plans now to be around the shack from 0000 to 2400 GMT September 17th-18th (c.w.) and 24th-25th ('phone) — details next month. The



A stream of W/K/VE/VO contacts and a good share of rarer DX entities keeps coming back to CR7DK's Bandmaster. The Hallcrafters receiver sorts out the many customers who queue up on several bands for Fernand's Mozambique confirmations.

shrewd heads will get up fixed arrays for Europe because a 3-element beam will be just another antenna in this competition! . . . From H1CWZ: "There now are very few hams in Italy because of the new regulations issued last year. All Italian hams have had to sit for examinations on theory and c.w. in order to get their old ham licenses renewed. So far the number of new licensees is around 200; before the regulations changes there were 4000 hams in Italy." Mario intersperses his own DX work on 80 through 10 meters with frequent 2-meter sorties and has a neat low-power 94/80 DX record. . . . Via KN2KHZ: OH1s RX 88 and others put the Aaland Islands on the air in late May with a 200-watt 813 on 3.5 and 14 Mc. using ground-plane and Vee antennas. U. S. contacts numbered 70 out of a 274-QSO total, all contacts save one being on c.w. The Aalands make up the rarest of Finland's ten departments (states) so their QSLs will be welcomed additions to many collections. . . . SR4L (Finland) seeks inspiration along the line of a receiver for their hq. station. Those with pregnant ideas can drop OH2RY lines. . . . G3JFD, via NNRC's *Official Bulletin*, clarifies British call-sign arrangements. "Firstly, no distinction is made between the various prefixes of the British Isles (G GC GD GI GM GW), which means that if there is a G3AAA, no other British prefix can be followed by "3AAA" unless G3AAA moves to another area. Secondly, the numbers in British call signs have no territorial significance whatever." GI G7 and G9 calls are specials used by experimental stations of various kinds. The GB prefix is reserved for use by exhibition stations and the like. Only the prefixes G2 and G3 at present are followed by three letters, these being call signs issued since 1945.

South America — From South Shetlander VP8A: "There will only be four VP8 stations active from Antarctica this coming year. They are VP8BD who will be operating from Grahamland, VP8s AQ BF and BH who will be operating from the South Shetlands. There is a faint possibility that a VP8 will be active from my old location in South Orkney Islands but the call is not known at the moment. The VP8 stations who were active from Antarctica during 1954 — VP8s AA AO AX and AZ — already have, or will have in the near future, returned to England." . . . W2BVS finds that CX7CO tunes the U. S. Novice

(Continued on page 126)



"There he is. . . . No, it's someone calling him. . . . What a pile-up! . . . Wait — he's coming back — got him!" CX2CF is shown here participating in the rapidly reviving sport of 10-meter DX chasing. Peter has a 4-250 final modulated by Class AB1 4-125s, and receives with an RME-45.

August 1955



Operating News



F. E. HANDY, WIBDI, Communications Mgr.
R. L. WHITE, WIWPO, Asst. Comm. Mgr., C.W.
PHIL SIMMONS, WIZDP, Communications Asst.

GEORGE HART, WINJM, Natl. Emerg. Coördinator
ELLEN WHITE, WIYYM, Asst. Comm. Mgr., Phone
LILLIAN M. SALTER, WIZJE, Administrative Aide

A Test for Handling Overseas Traffic. Regulations prohibit the handling of communications on behalf of third parties *internationally* by amateur radio, except where special arrangements have been made between nations. Chapter 9 of the ARRL *License Manual* details this prohibition (Article 42 of the Atlantic City documents). Our operating booklet likewise mentions the restriction in the section on handling messages. Third-party traffic under certain treaty provisions and limitations is authorized between the United States and Canada, Chile, Cuba, Ecuador, Liberia and Peru. Traffic may be freely handled with outlying U. S. territories and possessions wherever amateurs are licensed by the FCC, as well as with the Canal Zone. *Message traffic for U. S. military personnel overseas is permitted only with amateur stations identified by properly authorized call signs having a one or two letter prefix beginning with a W or K.*

Traffic of an unofficial nature that comes via MARS or on a military instead of an amateur frequency is sometimes re-originated or re-filed for handling within the U. S. A. as an amateur radiogram. Since Germany has been returned to the ranks of sovereign nations Article 42 is again applicable and traffic on amateur bands may *not* be handled directly with DLs, though such MARS re-files are perfectly legitimate. The form or procedure for such re-files is detailed on page 130, June 1953 QST.

Limitations Requested on Japanese Traffic. The Far East Auxiliary Radio League is the organization of the KAs in Japan. Pointing out that their request does not concern MARS programs or amateur operation in other than their region, the FEARL has requested KAs and those they work voluntarily to limit third-party traffic to personal problems such as arrival and departure messages, family illness, deaths, assisting dependents getting ready to go overseas, etc., and to carry out a reduction in third-party traffic of all kinds. The removal of any essential traffic in KA-land from their amateur 'phone bands to either MARS (military) frequencies or c.w. transmission and limitation of all 'phone patches to cases of actual need is urged by the FEARL. Important matters of finance or personal business they point out should be filed by commercial service both to give privacy and assured guaranteed delivery. It is also requested that any unnecessary greeting, etc., messages that unduly expand the volume of work be curtailed. From the data released by FEARL it appears that quite probably in view of Japan's resumption of licens-

ing (sovereignty) the JARL and commercials operating under Japanese license have objected to the essential character of some of the communications, doubtless in the light of the conflict with treaty provisions (Art. 42) as above mentioned.

P.A.R.E.C. The letters stand for Portable Amateur Radio Equipment Contest and recall to mind the famous Miles Per Watt contest of the Twenties. (u8GZ using '01A's and 199's won the Jewell Contest; on 40 meters in Jan. and Feb. '26 he worked oa6N and oz2XA with inputs of 1/2 watt, something to try on VKs and ZLs today!) The Field Day challenges our ability to "make under 30 watts count" but stand-by radio provisions for civil defense are far from fulfilled in the light weight, low-power equipment categories. The need for amateur hand-carried and mobile equipment, packaged for results with minimum weight, is therefore a measured objective in its own right by anybody's say so. So here's the background on how you can submit some equipment descriptions to a specialist group offering you certificates for your accomplishment in this constructional field.

To increase interest in, and encourage development of Low Power and portable equipment by radio amateurs, the QRP Society, an RSCB group, is running a constructional competition not to close until September 30, 1955 known as their Portable Amateur Radio Equipment Contest. This is open to all licensed amateurs and SWLs throughout the world either as individuals or in club teams. Any number of entries may be submitted, though the equipment itself is not to be shipped overseas. The QRP Society will give certificates for overseas entry descriptions adjudged best with its contest divided into four equipment-classes.

Class A — For hand carried portable receivers (up to 3 pounds), transmitters up to 5 pounds and transceivers up to 7 pounds. Must be dry battery operated, weights exclusive of batteries, phones, key, antenna. Economy of battery consumption, lightness, compactness, versatility and ease of operation will be considered.

Class B — For mobile transmitters, receivers or transceivers up to 10 pounds maximum weight, exclusive of batteries but inclusive of vibrator unit as necessary.

Class C — For transistor sets up to 2 pounds weight exclusive of auxiliary equipment.

Class D — For portable test gear of any type such as wave-meters, signal generators, etc. All must be amateur built, battery operated and truly portable.

A special certificate will be issued by the QRP Society to the best three American entries in each class. Submit entries before September 30, 1955 to J. Whitehead (Hon. Secy. QRP Society), 92

Rydens Avenue, Walton-on-Thames, Surrey, England. On page one of your entry give name, call and address of sender and name the equipment described. On page two give circuit diagram and components list. Show on page three layout sketches and photographs and on further pages give a detailed description of the gear, covering theoretical, constructional and operating aspects. Drop ARRL a QSL telling us the equipment you are reporting to the QRP Society, or an extra carbon if you can spare it. We're interested.

DX Club Sets High Operating Standards. The "Southern California DXER Award" is to be an engraved plaque, presented annually "for outstanding performance and meritorious achievement in amateur radio DX work among Southern California amateur radio operators." W6MUR explains that the first presentation by the Southern California DX Club will be at the joint DX clubs' meeting in Fresno in January, 1956. Nominations will be received by the club in the period November 1st to December 15th. The club stresses that the Southern California amateur who is the winning candidate does not necessarily have to be a member of the club. A club committee will be charged with weighing some of the following factors in making a choice for the plaque award. In the following, readers we think, will approve of the importance SCDXC has given in its listings of factors to the promotion of DX success in terms of positive operating courtesy and ability, with initiative in club work as well as in operating. The last item (k) spells out that the man with most power and ruthlessness does *not* necessarily win! The group considering the nominations and results for the year 1955 according to this may consider DX results obtained contrasted to the capabilities of the station. *How well an amateur performs with what he has*, if given an appropriate weighing by the award group, could give a Southern California amateur in the lower power category a chance at this one! Here are the items for objective rating of all possible candidates:

- (a) Operating ethics and courtesy.
- (b) Station activity.
- (c) Signal quality.
- (d) Observance of FCC regulations.
- (e) Contributions to Southern California DX: participation in club activities, contests and functions; attendance at club meetings; bulletin contributions, technical contributions and similar factors.
- (f) Contributions to amateur radio: helping new amateurs, or foreign amateurs in any way through expedition traffic, loans or gifts of parts or equipment, handling or supplying QSL cards, assistance with technical problems, etc.
- (g) Attitude toward fellow amateurs.
- (h) Attitude toward the public, including neighbors.
- (i) Perseverance: effort in listening for new countries; in obtaining missing QSL cards; in striving for DX goals of various sorts such as certificates or awards; in ferreting DX information.
- (j) Operating ability: copying through noise or QRM; code speed; ability to cope with confusion, etc.
- (k) Success, expressed as a qualitative ratio of DX worked to capabilities of station—how well an amateur performs with what he has.
- (l) (m) Other factors considered applicable.

—F. E. H.

WIAW OPERATING NOTE

A slight change has been made in the WIAW General-Contact schedule effective June 1st (see page 70, May QST). The station will no longer listen for Novices after the midnight (EDST) bulletins on 3555 kc. Tuesday and 7125 kc. Friday. Instead, WIAW will listen for Novices after the midnight (EDST) bulletins on 3555 kc. Wednesday and 7125 kc. Saturday (A.M.). The lithographed WIAW schedule now available on request shows this change.

The WIAW operating schedule (page 74, July QST) is still in effect.

BRIEF

In the Novice Round-up Results (May QST), the call of the Santa Clara Valley leader should have been shown as KN6EMO. In addition, information brought to our attention reveals that KN2IBH, not KN2ICU, was the rightful winner in N.Y.C.-L.I. section.

BRASS POUNDERS LEAGUE

Winners of BPL Certificates for May traffic:

Call	Orig.	Recd.	Rel.	Del.	Total
W3W1Q.....	55	1271	1350	81	2757
W7BA.....	15	780	753	26	1574
W3CTU.....	111	721	352	365	1549
W0BDR.....	5	767	734	24	1530
W9DO.....	8	706	678	36	1428
W3WG.....	23	690	664	0	1377
W0CPL.....	11	651	582	69	1313
W8SCA.....	6	640	523	2	1271
W7PGY.....	29	619	580	39	1267
W9NZZ.....	251	390	3	385	1029
W5DTA/5.....	35	461	483	20	999
W4COU.....	32	458	471	12	973
W7VAZ.....	10	428	406	22	866
W9YWL.....	32	390	413	20	855
W4PFC.....	6	408	390	15	819
W4PL.....	2	409	386	16	813
W4UHA.....	209	339	249	12	809
K4AKP.....	12	373	346	25	756
W4BLR.....	24	362	304	53	743
W0PZO.....	1	355	349	5	710
W9TT.....	4	387	316	0	707
W3WG.....	30	342	215	51	638
W9IDA.....	253	199	158	7	617
W7FRU.....	3	285	178	103	569
W4OCG.....	4	288	269	3	564
W0GAR.....	0	274	273	1	548
W9CXY.....	4	272	234	37	547
W4PU.....	10	261	220	41	522
K6EJT.....	42	190	271	27	530
W5KPB.....	2	260	243	18	523
W1EMG.....	2	271	201	45	519
W1CRW.....	11	248	239	7	505
W3WUE.....	3	289	190	23	505

Late Report:

W3WG (April)	18	330	313	0	661
--------------	----	-----	-----	---	-----

More Than-One-Operator Stations

W6IAB.....	53	1602	1352	250	3257
K4WAR.....	987	558	546	12	2103
K5FBF.....	72	956	992	32	2052
K6AJF.....	761	882	424	128	1895
K5WSP.....	213	398	607	4	1222
K1WAB.....	40	530	500	19	1089
K5FFA.....	42	432	404	28	906
K4GGE.....	137	355	310	48	850
W6YDK.....	23	401	345	56	825
K42MA.....	344	234	206	28	812
K3WBJ.....	36	244	246	34	560
K42AK.....	134	202	184	18	538
K4FDC.....	127	205	185	20	537

Late Reports:

KA2GE (April)	122	442	406	36	1006
K1WAB (April)	28	315	598	12	953
K4WAR (April)	92	267	318	41	718

BPL for 100 or more originations-plus deliveries:

W4WOX.....	192	W2HKA.....	120	W4KKW.....	103
W4HDR.....	180	W9FFC.....	118	W1LYL.....	102
W8PHA.....	172	W5UBW.....	116	W0NYI.....	102
W4DDY.....	155	KA2HQ.....	115	W4BWR.....	100
W51WJ.....	141	W6USY.....	114	Late Reports:	
W4BYE.....	127	W9SAA.....	110	W7WUG (April)	158
W1BTY.....	124	W2CXM.....	103	W3CVE (April)	125

More-Than-One-Operator Stations

K5FEF.....	166	KR6KS.....	130
------------	-----	------------	-----

BPL medallions (see Aug. 1954 QST, p. 64) have been awarded to the following amateurs since last month's listing: W4DRD

The BPL is open to all amateurs in the United States, Canada, Cuba, and U. S. possessions who report to their SCM a message total of 500 or more, or 100 or more originations-plus-deliveries for any calendar month. All messages must be handled on amateur frequencies, within 48 hours of receipt, in standard ARRL form.

APRIL 30TH RACES TEST

We use the above title with reservations. There seems to have been some question as to whether this was a RACES test or an "Amateur Test of RACES Potential." The latter is probably a better description of it, but it's too long for a title. Actually, the test included AREC organizations in all stages of RACES preparation as well as those already RACES-authorized in FCDA Region I.

A bit of background will be pertinent. As long ago as last October, FCDA by official letter requested ARRL to assist in conducting a test of RACES facilities and potential in one of its regions, to serve as a monitor or "sounding board," if you will, for the nationwide Operation Alert test to be conducted in June. Naturally, we agreed to do so and alerted our ECs in Region I by special bulletin. A preliminary meeting was held in West Hartford in early February to discuss plans with representatives of FCDA and others. In late March, a meeting of all state c.d. radio officers and all ARRL SECs in the region was held in New York to finalize plans. It was at this meeting that the decision was made to include all amateurs working in civil defense, whether they were finally authorized for RACES or not. Only in this way would an accurate idea of RACES potential be obtained.

As it turned out, not all RACES authorized groups participated — or if they did, they didn't tell us about it. We ran two surveys, one before the test on the basis of those who expected to participate, and one after the test on the basis of those who actually did so. Let's compare them briefly.

A total of 122 ECs made preliminary reports on their potential for the April 30th Test. Of these, only 48 reported actual results; however, 49 additional ECs, who did not make preliminary reports, also reported results, making a total of 97 ECs who did report results. Compared to the 122 preliminary, this is a mighty good percentage. To be statistically accurate, however, the percentage of participants compared to the number who expected to participate was 39.3%.

A comparison of expected with actual participation can best be summarized in the following table:

Item	Expected	Actual
Fixed Control Stations	664	216
AREC members participating	1319	671
Total operators participating	2019	873
Mobiles (total)	802	233
on 75-80 meters	42	11
on 10 meters	440	144
on 6 meters	20	18
on 2 meters	301	79
Hand-carried portables	141	22

No comment is needed on the above data. They speak for themselves. Naturally, they reflect only reports received. We have no notion of how many groups who said they intended to participate actually did so but didn't report it — or how many expected to and did take part but didn't report either time. These are just some of the imponderables about this business.

A brief rundown on statistical results of the April 30th Test and we'll be done with them. There were 671 AREC registrants participating, 89 non-amateur operators and 113 non-AREC amateurs assisting. Stations used consisted of 216 fixed control stations, 236 other fixed stations and 233 mobiles. Most of the mobiles (62%) operated on ten meters, with two meters, six meters and 75 meters following in that order. Forty-three ECs reported that CD officials were present at the test, 36 that they were not; the rest did not say. Twenty-five ECs rated non-RACES CD cooperation as excellent, fifteen as good, seven as fair, five as poor, two as "lousy" and fourteen said cooperation was non-existent.

Eastern Massachusetts section ECs contributed the greatest number of reports on the test (18), with Connecticut second (12), Eastern New York third (11) and Western New York fourth (10). Western New York had the greatest number of participating operators (192), with Eastern New York second (159) and New York City-Long Island third (132). In mobiles, Western New York was high with 65, New York City-Long Island second with 41, and Eastern New York third with 32.

The test started at 1530 and lasted until 2130 EST, in order to get the best possible cross-section of band conditions during daylight, twilight and total darkness. Many of

the participating groups kept active the whole period, changing "shifts" every two hours in order to get a better picture of operating requirements in the real thing. Circuits were kept heavily loaded with "canned" messages in order closely to simulate actual emergency operating conditions.

FCDA sent Jim MacGregor, W8DUA, into Region I to observe the test first hand. Jim visited the New York State control center in New York City, then in the company of New York State RACES Radio Officer W2BGO, he journeyed into Connecticut for a visit to Connecticut installations and ARRL Headquarters.

Our count of ECs in FCDA Region I is 440. Ninety-seven reporting results is 22%. This is about what can be expected — in fact, it's better than most of our previous reporting records; which isn't the same as saying it is good.

The record does not do justice to the performance of the Rhode Island gang, as reported by SEC W1TQW. Twenty recently-appointed ECs activated communications networks in 16 major cities and towns throughout the state, with 200 amateurs responding to the call — about one third of all the amateurs in the state. Each of the 16 nets, consisting of a control station controlling a mobile net, maintained contact with a two-meter substation operating at state level. Traffic originated in any locality would be picked up by a mobile, transmitted to his control, passed to the state station and relayed into state headquarters in jig time. A total of 307 messages were routed to state control in Scituate by this method.

Termed a success in glowing phrases in Rhode Island, the April 30th Test was described less enthusiastically in other states in the region. The statistics show that a good showing was made in New York, as was to be expected of a well-organized state RACES establishment. Statistics fail to do justice, however, to the showing in Northern New Jersey, which was better than indicated. Connecticut maintained its standard as a pace-setter for RACES organization, although there was some misunderstanding concerning eligibility to participate which kept attendance down. This same misunderstanding occurred in Massachusetts, another well-organized state from the c.d. angle. The remaining states participated at about the expected level.

It is easy enough to be mealy-mouthed and say the test was an "overall success." Actually, whether or not it was so is a matter of individual opinion — and we have heard opinions variously from "complete flop" to "indeed a successful demonstration." Looking at it from an overall viewpoint, which probably we at headquarters are better qualified to do than most others, the test appeared to have only partially served its purpose, which was to indicate amateur radio civil defense potential. We think the potential is considerably greater than shown by test results received here.



Under the heading of "Wouldn't It Be Nice If . . ." most of our emergency net organizers and net controls would list ". . . we had clear channels for our emergency nets." We agree — it would be nice, and if we are going to dream, that's a good enough thing to dream about. But alas, comes the awakening and we have to face the fact that we do not have clear channels, and only in the direct emergency can we expect to have anything approaching them. It is common practice among many nets to request casual stations to QSY when they cause QRM to a net drill, simulated emergency test or any other AREC or RACES activity. Some of them move gladly (often only to run into another net), some reluctantly with mutterings or sarcasm, and a few stand on their rights and downright refuse to budge. All who are asked to move, even those few who might agree that what you are doing is more important than what they are doing, experience at least a slight twinge of irritation.

The average amateur will, when he realizes that he is interfering in a net drill, move off of his own accord, or QRT until the drill is over, without being asked. Those who do not do so are usually the type who would not do so

This is the communications section of the Glencoe Mutual Aid Area auxiliary control center at Strathburn, Ont. VE3WY is Coordinator for civil defense in this area, and sent us the picture, which he has plainly labeled. Note that No. 1 position operates on 3502 kc. c.w., No. 2 on 3675 kc. 'phone and No. 3 on 3535 kc. c.w. Actually, the latter two are "receive only" positions, while the Viking at No. 1 transmits on any one of the three frequencies.



even after being asked, and the only result of asking them will be creation of hard feelings, or exchange of harsh words over the air. So what have you gained?

The solution? There is none, really. Our amateur bands are crowded, and we should be glad they are, because if they were not we probably wouldn't keep them intact very long. Such being the case, we have to make the best of a situation in which not all amateurs are consciously dedicated to public service, and grin and bear it—and think of how much practice we are getting trying to copy traffic or emergency dispatches under adverse conditions.

On February 25th, ice and water seepage broke an underground cable in La Crosse, Wisc., severing communications with CAA's French Island facility. W9OGT, a communicator working for CAA, went into action from his mobile, contacting W9GPU in La Crosse. W9GPU contacted W9OOL in Madison, who served as a delivery point for hourly weather sequence reports to USWB officials in Madison until the cable was repaired. North Central Airlines also benefited from this operation. As a result of this service, W9AZN, representing CAA, presented the two amateurs with certificates of appreciation.

On May 6th, 1819 CST, tornadic winds, rain and hail hit Temple, Texas, wreaking much destruction and knocking out power. Members of the Temple Amateur Radio Club were alerted and assembled at the Police Station on a standby basis. Shortly thereafter, in answer to a call, the amateurs furnished a power generator for flood lamps at the scene of the major damage. This power unit was taken out of service at 2200 when the National Guard arrived with other power units. Communications were furnished from the scene of the disaster by W5PNP/m and W5VLF/m through fixed station W5CHF. Stations participating were W5s VLF SBS CHF JIB WDW WMX PNP UPO VHF/m DXD RDL DSG and TVA. This information furnished by W5VLF through W5VHF, EC from Waco who followed the storm into Temple.

— W5RRM, SEC Northern Texas

On May 14th, while driving about 30 miles from Houston, W5GLS suddenly became ill. He contacted W5GVW/m on 75-meter mobile, and had them call his doctor, who advised W5GLS to get to any hospital as soon as possible. When GLS indicated the hospital he was headed for, the doctor called this hospital and made all arrangements. W5GVW/m also made arrangements for a police escort. The doctor stated that if GLS had not gotten to the hospital, he would have died. W5GVW, assisted by WN5GWP, handled this emergency traffic like an old timer. — W5FEK

A plane crash in Northboro, Mass., alerted the Worcester AREC group on May 26th. EC W1SPF started the ball rolling by firing up on ten meters as soon as he heard about the crash and calling W1UQW, who was talking with W1YPK in Holden. In less than two hours, nine other stations had reported in, completely without warning or notification of any kind, showing how frequently members of the Worcester AREC-RACES group guard their emergency net frequency. W1ZMM/m went to the fire depart-

ment at Northboro and was told an ambulance had already been sent to the scene of the crash. W1MIA was asked by the Marlboro Airport to locate the plane and get the name of the party or parties involved in the crash. W1ZMM/m and W1JWM/m proceeded to the scene of the crash, but police withheld the name of the crash victim, who was killed. The plane number was reported, however, to the Marlboro authorities by amateur radio. W1LQW handled the net activity and everybody cooperated 100 per cent. Others who participated include W1s EBU RCJ MEG MT BIA and PMZ. — W1SPF, EC Worcester, Mass.

The Purgatoire River in Colorado went on a rampage on May 26th and gave the little town of Trinidad, Colo., a pretty hard time. Amateurs from throughout the area figured prominently in the communications work. W0NVU took the brunt of the load in Trinidad itself, with amateurs from all over the state and adjoining states helping out with the traffic, most of it welfare. Bob worked for 40 hours without a break. He was assisted by the Hi Noon Net and other stations from the general area in handling over 300 emergency messages into and out of the flooded district. K0WBB, with Mac operating from Fort Carson, was also very active in this work. Mac later took a mobile unit to Trinidad, leaving K0WBB operation to two other operators, Milt Moore and Dave Morset. Others known to have been assisting were W0s SUP PGX KQD ICR PGN K0ANZ W7SPI/0 Quentin Fuller, Tommy Clark.

A missing person search at Amos, Quebec, required the assistance of amateurs in that area. The Molson Emergency Unit (a de luxe emergency trailer unit sponsored by Molson's Brewery) traveled from Montreal to Amos to participate in the search, but had to leave without its regular operator, VE2MW. Siscoe EC VE2FL contacted the driver as the unit was passing through town and offered assistance. Then he called Assistant EC VE2ADD at Amos, who agreed to alert local amateurs to assist in the search. Thus, when the unit arrived at Amos it was provided with a radio operator in the person of VE2AHV, who went with it to search headquarters, 20 miles northeast.

The station in the unit went on the air at 1430 EST and was operated almost continuously by VE2AHV and VE2ADD (who arrived later) until 2330. VE2ADA was also on hand to help operate hand-carried units with the mobile unit. The search continued on June 8th and June 9th, with the following amateurs taking part in the action: VE2s AOF AVH ADI AEO OB HL AHU FL and VE3TX. The search was abandoned on June 10th at 2300.

— VE2FL, EC Siscoe, Que.

Fourteen SECs reported April activities on behalf of 5228 AREC members. This includes a report from the North Texas SEC which was in written nonstatistical form. It also includes reports from old stand-bys in the following sections: Minn., Wash., Tenn., Western N. Y., N. Y. C.-L. I., Georgia, E. Fla., Ala., San Joaquin Valley, Wisc., S. Dak., Los Angeles and Oregon. Twenty-three SECs have now submitted reports in 1955. The April reporting record is equal to that of a year ago in number of reports, far exceeding it in AREC members represented.

A.R.R.L. ACTIVITIES CALENDAR

Aug. 5th: CP Qualifying Run — W6OWP
 Aug. 16th: CP Qualifying Run — W1AW
 Sept. 3rd: CP Qualifying Run — W6OWP
 Sept. 14th: CP Qualifying Run — W1AW
 Sept. 15th: Frequency Measuring Test
 Sept. 17th-18th: V.H.F. QSO Party
 Oct. 7th: CP Qualifying Run — W6OWP
 Oct. 8th-9th: Simulated Emergency Test
 Oct. 13th: CP Qualifying Run — W1AW
 Oct. 15th-16th: CD QSO Party (c.w.)
 Oct. 22nd-23rd: CD QSO Party ('phone)
 Nov. 5th: CP Qualifying Run — W6OWP
 Nov. 12th-13th, 19th-20th: Sweepstakes
 Nov. 18th: CP Qualifying Run — W1AW
 Dec. 2nd: CP Qualifying Run — W6OWP
 Dec. 12th: CP Qualifying Run — W1AW

RACES News

Operation Alert, 1955, has come and gone. RACES was active — more so, we dare say, than most branches of civil defense in most parts of the nation, generally speaking. Reports from participants are beginning to reach us. There will be a QST write-up on the amateurs' participation in this nationwide exercise, in September QST if we can make it. Its location in the magazine will of course depend on the material available. So send us photos if you want to make it "up front" material; otherwise it may be relegated to six point.

Recent conversations with people at Battle Creek (FCDA National Hq.) bring out numerous facts and opinions concerning the test, mostly a result of monitoring. One of the most glaring deficiencies noted from that level was the improper use of frequencies and technique, according to a pre-copy telephone conversation. The feeling is that not enough advantage is being taken of the use of c.w. for medium- and long-haul traffic in most areas. Instead, attempts (often futile, almost always frustrating) are being made to handle all this traffic on 75-meter 'phone.

The above comments are not ours; they come unsolicited from FCDA Headquarters, where monitoring indicated too much use of 75 'phone, not enough use of 80 c.w. for RACES operations during the drill. Also, no action was heard on the DCS frequencies of 1750-1800 kc., and only one network was observed operating in the 160-meter RACES segments. One station was heard using c.w. on 3993 kc., trying to cut through the QRM.

All things are relative, however. We are better off thinking our performance, generally speaking, was below standard (that is, below the standard we would like) than resting on our laurels, such as they are. Actually, the nation-wide RACES establishment compares most favorably with any other branch of civil defense in its participation in this test. In the few local control centers we visited, RACES facilities operated longer and harder than any other c.d. facility. Publicity was favorable. We made a good showing; but it could be a lot better. Next year it shall be.

South Dakota amateurs are getting after their state officials to start something along RACES lines. At a meeting in Mitchell on April 17th, W0GCP called the meeting to order and speakers included W0GCP (the SEC), W0RRN (the SCM) and several other ARRL and state officials. The governor has been contacted and has expressed himself in favor of organizing the amateurs for c.d. The group at Mitchell recommended the appointment of Myron Jones, W0OXC, as state radio officer. The meeting continued to discuss detailed plans for statewide organization under the AREC and RACES. Keep your eye on South Dakota.

In New York State, W2BGO reports that the RACES organization is assisting the Radiac (radiological monitoring) branch of civil defense by transmitting c.d. fallout weather reports twice a day except week-ends and holidays. They are received from the Weather Bureau in New York City by radioteletype and put on the air at 1000 and 1700. Radiological chiefs throughout the state have the radiac

people receive these reports, break them down and plot the winds aloft. It's good training in communication, meteorology and coordination combined.

Another state to keep your eye on is Kentucky. SEC W4CDA reports having attended a meeting on April 8th in which a great many state c.d. officials were included, including W4BAZ (Communications Director of 3rd Mobile Support Group) and W4MGT (Communications Director of state OCD). At this meeting, the discussion centered around establishing c.d. communications to the amateurs in a RACES network. It was decided that the state OCD will endeavor to get funds for equipment to establish such a network.

TRAFFIC TOPICS

Every traffic net is an emergency net, and every emergency net is a traffic net. This is, or should be, axiomatic in our public service establishment among amateurs. It is something which we have urged many times, and it bears repeating.

Each of us has at one time seen an emergency net in which members seem to have no conception of how to handle traffic; and most of us have also seen traffic nets which not only have no plans for but disdain operating in an emergency. Each group has something to learn from the other. Traffic handling and emergency preparedness are not dissociated subjects. For a traffic net which cannot effectively operate under emergency conditions is not much of a traffic net, and an emergency set-up which cannot effectively handle traffic will be an awful flop in an emergency.

Enough said? No, not quite. This is a traffic column, and we are here concerned principally with traffic nets. It seems to us that there are an awful lot of them in operation these days which have no plans to operate in an emergency. How about in your section? Do plans exist to activate your net, on its regular operating frequency, to handle both official and individual welfare messages at a moment's notice? If no, why not get together with your SEC to put such plans into effect?

As for the National Traffic System, plans for activating these nets for emergencies have existed right along. They were first promulgated in an Emergency and Traffic Bulletin dated "Spring, 1950." We think they will now bear repeating.

When an emergency situation arises, regardless of the time of day or night, the NTS net or nets in the affected area should be activated and ready to handle any and all emergency traffic, while NTS nets in surrounding areas should be activated to take care of outside communications if and when called upon. Depending upon the urgency involved and the volume of emergency traffic, official or otherwise, the net manager concerned has the duty of determining whether his net in any particular situation shall handle official emergency traffic only, all emergency traffic, or all traffic as usual. His decision should be complied with by all traffic handlers concerned.

The extent of NTS activation in emergencies depends entirely on the extent of the emergency. If a local flood, the section traffic net will probably be sufficient. If covering an area of several states, probably the regional net should be activated in addition to section nets, with "shuttle" liaison between them, and possible activation of the area circuit to provide outside contact. If the emergency is area-wide, all NTS nets within that area should be on the job, with possible activation of an adjacent area net to provide outside contact.

The above is policy now with the National Traffic System. We think it should be an over-all policy of traffic nets to be worked into their section-wide emergency organization. In some cases this has already been done. In those where it has not, don't you traffic men wait for your SEC to act. Offer your services and those of whatever net you represent. As a traffic man, you can do a world of good in any emergency.

Two miscellaneous traffic net reports: (1) Early Bird Net traffic count for May was 613; (2) The First Call Area section of TCPN registered 749 messages, with 12 stations participating, during May. The Second Call Area section reported 571 messages with 9 stations.

From an anonymous contributor: "Heard the following on 75 'phone: 'Say OM, I am short five or six messages in my tally for making BPL this month. Can you think up any

old thing and send it to me and I will make a message out of it so I can add to the score."

"What in the world has happened? Have the young squirts turned BPL into a SS contest?"

National Traffic System. Anent the prospect of reactivating the Mountain Area Net, W9KQD has compiled some statistics to show that it "ain't easy." The Mountain Area (i.e., generally speaking the area encompassed by the MST zone) has a population of less than one third that of the Pacific Area, about a tenth of the Central Area and a fifteenth of the Eastern Area. Amateur population is roughly comparable. There would also be the necessity for twelve additional TCC schedules per week. To reactivate a Mountain Area Net, W9KQD concludes, would require a great many more ardent NTSSers than now appear to be extant, at least equivalent to those in the Eastern Area with its much larger population.

Do they exist? If not, can they be created? Colorado alone is contributing more personnel to TCC than any other single state. If the entire Pacific Area produced TCC operators at the same rate as Colorado, that Area would have 75 TCC operators, Central Area would have 177 operators, and Eastern Area would have 323 operators. But an area organization cannot rest on the shoulders of one section. How about some of the other Mountain Area states? If you want a separate Mountain Area organization, you'll have to produce the operators. It was for lack of operators that MAN had to be abandoned in the first place.

May reports:

Net	Sessions	Traffic	Rate	Average	Representation
EAN	22	1076	—	49	94.7%
PAN	24	938	0.67	39.1	—
1RN	25	382	0.44	15.3	85.1
2RN	41	190	0.24	4.6	—
3RN	44	290	0.53	6.6	76.5
4RN	20	193	1.02	9.6	67.9
RN5	44	1026	0.57	23.3	69.7
RN6	34	231	—	—	—
8RN	35	100	—	3	64.8
TEN	64	1229	—	19.2	60.2
TRN	41	132	0.60	3.3	62.6
Sections *	400	2466	—	—	—
TCC (Eastern)		273	—	—	—
TCC (Pacific)		701	—	—	—

Summary	794	9227	4RN	10.4	EAN
Record	794	9433	—	22.1	—

Late reports:

4RN (Apr.)	20	101	0.16	5.1	61.4%
EAN (Apr.)	26	882	1.20	34	89.1
8 RN (Apr.)	34	148	—	4.5	80.4
TEN (Apr.)	69	1790	—	26	70.3

* Section nets reporting: GSN (Ga.); QKS, QKS-SS & QKN (Kans.); TLCN (Iowa); AENB & AENP (Ala.); CN & MCN (Conn.); WVN (West Va.); SCN & CVN (Calif.); NTX (Texas); KYN (Ky.); MSN Fone & MSN CW (Minn.).

Several section net managers have asked why their nets cannot get more than summary mention in this column. The reason is that there simply isn't room, fellows. Your SCM's activities column is the place for mention of any details of section net operation. The mention below of regional and area nets is included here because these nets are not within section boundaries; if they were, undoubtedly they also would receive no space here. But section nets are a very vital part of NTS, make no mistake about it. We would like to have data each month on your schedule, number of sessions, traffic handled and list of NCSs.

Net notes: 1RN conducted a special session on Saturday, May 21st, to assist the Cranston, R. I., YMCA drive, at which amateur radio was a feature. The net was active from 1300 until after 2000 that day, handled 86 messages. A 3RN certificate has been issued to W3YYC. Heavy QRN is hampering operation of 4RN, but new manager W4BVE is showing progress. RN5 is handling more traffic than ever before in its history. Much of this is due to the efforts of old-time-traffic-man W5IGW, who is QNI almost every session and on May 21st NCS'd the net for six hours, clearing 204 messages. RN6 expects to have a KH6 representative soon. Many sessions of 8RN were not reported in May. TRN is now operating two sessions nightly, at

1845 and 1945 EST Monday through Friday, the early session on 7070 kc. and the late one on 3535 kc. TRN certificates have been issued to VE's 1OM 1HJ 2DR 2CP 3BUR 3AVS 3TM 3AJR and 3AUU.

TCC Area Directors are having a tough time keeping their rosters full during the summer. W8UPB reports for Eastern Area that eight TCC stations made 25 reports in May, with W1EMG passing the most traffic. W6HC reports for Pacific Area that nine TCC stations reported, with W0EKQ handling the greatest amount of traffic. Harry is also desirous of relinquishing his TCC job, now that he has taken over as ARRL Director. Any takers?

ELECTION NOTICE

(To all ARRL members residing in the Sections listed below.)

You are hereby notified that an election for Section Communications Manager is about to be held in your respective Section. This notice supersedes previous notices.

Nominating petitions are solicited. The signatures of five or more ARRL full members of the Section concerned, in good standing, are required on each petition. No member shall sign more than one petition.

Each candidate for Section Communications Manager must have been a licensed amateur for at least two years and similarly a full member of the League for at least one continuous year immediately prior to his nomination.

Petitions must be in West Hartford, Conn., on or before noon on the closing dates specified. In cases where no valid nominating petitions were received in response to previous notices, the closing dates are set ahead to the dates given herewith. The complete name, address, and station call of the candidate should be included with the petition. It is advisable that eight or ten full-member signatures be obtained, since on checking names against Headquarters files, with no time to return invalid petitions for additions, a petition may be found invalid by reason of expiring memberships, individual signers uncertain or ignorant of their membership status, etc.

The following nomination form is suggested: (Signers will please add city and street addresses to facilitate checking membership.)

Communications Manager, ARRL. [place and date]
38 La Salle Road, West Hartford, Conn.

We, the undersigned full members of the.....
..... ARRL Section of the.....
Division, hereby nominate.....
as candidate for Section Communications Manager for this
Section for the next two-year term of office.

Elections will take place immediately after the closing dates specified for receipt of nominating petitions. The ballots mailed from Headquarters to full members will list in alphabetical sequence the names of all eligible candidates.

You are urged to take the initiative and file nominating petitions immediately. This is your opportunity to put the man of your choice in office.

— F. E. Handy, Communications Manager

Section	Closing Date	SCM	Present Term Ends
Yukon *	Aug. 15, 1955	W. R. Williamson	Mar. 17, 1949
West Indies	Aug. 15, 1955	William Werner	Aug. 15, 1952
Utah	Aug. 15, 1955	Floyd L. Hinshaw	Feb. 18, 1954
Colorado	Aug. 15, 1955	Karl Brueggeman	Feb. 16, 1955
Vermont	Aug. 15, 1955	Robert L. Scott	Oct. 15, 1955
South Carolina	Aug. 15, 1955	T. Hunter Wood	Oct. 15, 1955
San Diego	Aug. 15, 1955	Don Stansifer	Oct. 15, 1955
Western Florida	Aug. 15, 1955	Edward J. Collins	Oct. 15, 1955
East Bay	Aug. 15, 1955	Guy Black	Resigned
Western New York	Sept. 15, 1955	Edward Graf	Nov. 21, 1955
Eastern New York	Oct. 14, 1955	Stephen J. Neason	Dec. 14, 1955
Ohio	Oct. 14, 1955	John E. Siringer	Dec. 14, 1955
Alabama	Oct. 14, 1955	Joe A. Shannon	Dec. 14, 1955
Quebec *	Oct. 14, 1955	Gordon A. Lynn	Dec. 15, 1955
Illinois	Oct. 14, 1955	George T. Schreiber	Dec. 15, 1955
Alaska	Nov. 15, 1955	Dave A. Fulton	Jan. 15, 1956

* In Canadian Sections nominating petitions for Section Managers must be addressed to Canadian Director Alex Reid, 169 Logan Ave., St. Lambert, Quebec. To be valid, petitions must be filed with him on or before closing dates named.

ELECTION RESULTS

Valid petitions nominating a single candidate as Section Manager were filed by members in the following Sections, completing their election in accordance with regular League policy, each term of office starting on the date given.

Nebraska	Floyd B. Campbell, W0CBH	April 15, 1955
Saskatchewan	Harold R. Horn, VE5HR	April 15, 1955
North Dakota	Elmer J. Gabel, W0K7Z	June 15, 1955
New York City		
Long Island	Harry J. Dannals, W2TUK	July 31, 1955
San Francisco	Walter A. Buckley, W6GGC	Aug. 14, 1955

In the New Mexico Section of the West Gulf Division, Mr. Einar H. Morterud, W5FPB, and Mr. Travis W. Andrews, W5BIH, were nominated. Mr. Morterud received 100 votes and Mr. Andrews received 69 votes. Mr. Morterud's term of office began May 4, 1955.

In the Wisconsin Section of the Central Division, Mr. Reno W. Goetsch, W9RQM, Mr. Lloyd D. Watson, W9IXA, and Mr. Elton L. Miottel, W9BVG, were nominated. Mr. Goetsch received 303 votes, Mr. Watson received 83 votes, and Mr. Miottel received 81 votes. Mr. Goetsch's term of office began May 12, 1955.

In the Maine Section of the New England Division, Mr. Allan D. Duntley, W1BPI/VYA, and Mr. Carl E. Watson, W1LHA, were nominated. Mr. Duntley received 113 votes and Mr. Watson received 52 votes. Mr. Duntley's term of office began May 16, 1955.

In the South Dakota Section of the Dakota Division, Mr. Les Price, W0FLP, and Mr. John W. Sikorski, W0RRN, were nominated. Mr. Price received 75 votes and Mr. Sikorski received 61 votes. Mr. Price's term of office began July 2, 1955.

CODE PROFICIENCY PROGRAM

Twice each month special transmissions are made to enable you to qualify for the ARRL Code Proficiency Certificate. The next qualifying run from WIAW will be made on August 16th at 2130 EDST. Identical texts will be sent simultaneously by automatic transmitters on 1885, 3555, 7125, 14,100, 21,010, 52,000 and 145,600 kc. The next qualifying run from W6OWP only will be transmitted on August 5th at 2100 PDST on 3590 and 7138 kc.

Any person may apply; neither ARRL membership nor an amateur license is required. Send copies of all qualifying runs to ARRL for grading, stating the call of the station you copied. If you qualify at one of the six speeds transmitted, 10 through 35 w.p.m., you will receive a certificate. If your initial qualification is for a speed below 35 w.p.m., you may try later for endorsement stickers.

Code-practice transmissions will be made from WIAW each evening at 2130 EDST. Speeds are 15, 20, 25, 30 and 35 w.p.m. on Monday, Wednesday and Friday, and 5, 7½, 10 and 13 w.p.m. on Sunday, Tuesday, Thursday and Saturday. Approximately 10 minutes' practice is given at each speed. References to texts used on several of the transmissions are given below. These make it possible to check your copy.

Date Subject of Practice Text from June QST

Aug. 1st:	A Broadband Antenna for 75 meters, p. 11
Aug. 4th:	Parallel 6146s . . . , p. 14
Aug. 9th:	Better Selectivity . . . , p. 18
Aug. 12th:	Elementary TV Trouble Shooting, p. 23
Aug. 17th:	Modifications in the Viking II, p. 27
Aug. 23rd:	Board Meeting Highlights, p. 32-A
Aug. 26th:	A 5-Over-5 for 50 Mc., p. 36
Aug. 30th:	1st ARRL Sweepstakes Results, p. 48

NATIONAL CALLING AND EMERGENCY FREQUENCIES (kc.)

C.W.: 3550, 7100, 14,050, 21,050, 28,100.

*Phone: 3875, 7250, 14,225, 21,400, 29,640.

DXCC NOTES

In accordance with the DXCC rules, "Confirmations from additional countries may be submitted for credit each time ten additional confirmations are available." The large number of cards currently being submitted in batches smaller than the required ten is resulting in a tremendous amount of extra work and consequent delay in handling. These can be reduced if DXCC members will adhere to this rule. Endorsements (and subsequent QST DXCC box men-

tion) are issued only when sufficient cards are submitted to increase a total from one bracket (110, 120, 130, etc.) to another. There is, therefore, no point to sending confirmations that increase a total from 135 to 137, for example. In such a case, a member may, of course, submit only five cards, to bring his total to 140.

In order that the Honor Roll listings and W/VE/VO Call Area and Continental Leader listings may be maintained from month to month, three exceptions to the rule are allowed: (1) If you already have credit for 235 or more countries (c.w./phone), or can bring your total above 235 by submitting fewer than the ten cards required by the rules, we invite you to do so. (2) If you already have credit for 200 or more countries on 'phone, or can bring your total above the 200 mark by submitting fewer than ten cards, you are similarly invited to send in the additional confirmations. (3) If a W/VE/VO can bring his total above, or tie, that of the leader in his call area, or those outside of W/VE/VO can tie, or bring their totals above the leader on their continent as shown in the DXCC box.

DX CENTURY CLUB AWARDS

HONOR ROLL

W1FHH...258	W68N...249	W3JTC...247
W6VFR...254	W8NDB...249	W3KT...247
W6AM...253	PY2CK...249	G2PL...247
W6ENV...251	W3GHD...248	W2AGW...246
W8HGW...251	W6SYG...248	W6MEK...246
W3BES...250	W2BXA...247	W6MX...246
W0YXO...250		W7AMX...244

Radiotelephone

PY2CK...242	W1JCX...218	W8HGW...214
W1FHH...230	W1MCW...216	W3JNN...212
VQ4ERR...230	W1NWO...216	W0RBI...210
Z86BW...226	XELAC...215	W0NDA...209

From May 15, to June 15, 1955 DXCC certificates and endorsements based on postwar contacts with 100-or-more countries have been issued by the ARRL Communications Department to the amateurs listed below.

NEW MEMBERS

HB9ET...147	KZ5DG...165	D1A2C...101
W5PZL...123	W7FB...104	G2WQ...101
W3KVB...118	HB9MO...104	ZD2DCP...101
W8OCV...117	SM3BIZ...104	W4PDU...100
W1JDE...116	W6GDI...102	W4TFB...100
W2HO...112	OE13USA...102	W5QKZ...100
EA5AF...108	OH5OP...102	W8ZCK...100
W6NDF...107		ON4HB...100

Radiotelephone

W3KVB...116	PY8CO...107	KZ5DG...101
EA6AR...109	W4EBO...104	VP6WB...101
W8RVU...108	W9WHM...102	K2CJN...100
11AHW...108	W2CQP...101	W9ABA...100

ENDORSEMENTS

W0DAE...229	W0BQE...170	PY5UG...140
W5KC...225	ON4PA...170	W3KBU...137
W1BIH...220	W0AZT...168	W8DUB...137
W7GUV...220	DL1QT...161	K2BZT...133
W5ADZ...215	PY1AD...160	W4BQY...131
W8JBI...212	W1BLO...153	W5UX...130
W4OM...210	W6DBP...153	W7HQC...130
W7HXC...201	W7KVV...153	PY4AJD...130
W1BLF...200	W8YHO...152	W5HDS...127
W2TXB...200	CR6AL...151	ZE3JP...126
CN8MM...196	W3AYS...150	W9EU...120
W5ALA...190	W9NLY...150	W9VP...120
W9GRV...190	W9MQK...142	W9UKG...116
G3DCU...172	W9JIP...141	K2EDL...111
W5FXN...171	W1BIL...140	W6UUK...111
LA6U...171	PA0LR...140	W2CR...110

Radiotelephone

W8BF...200	W1BLF...167	F8SK...131
W8GZ...200	W5ALA...167	W5KBU...130
CM9AA...192	PY4KL...162	W7HXG...115
CN8MM...191	W1HX...151	LUBBS...113
W3GHD...181	W4CMA...150	W4EEB...110
W5ASG...173	W8BKP...150	W4JCO...110
W7BMX...170	W5KC...143	HP1BR...110
	W8VDJ...140	

W/VE/VO Call Area and Continental Leaders

W4BPD...241	VE3QD...210	VE5AW...160
W5MIS...243	VE5QZ...140	VO6EF...190
W9NDA...243	VE6GD...108	4X4RE...210
VE1HG...150	VE7HC...209	Z86RW...233
VE2WW...181		ZL1HY...238

Radiotelephone

W2APU...202	W6DI...205	VE2WW...102
W2BXA...202	W7HIA...181	VE3KF...163
W4HA...180	W9AIW...179	VE7ZM...140
W5BGP...207	VE1CR...120	OD5AB...170
W6AM...205		ZL1HY...196

SCM — AREC — ORS — CP — SEC — OBS — TCC — OO —
Station Activities
 OES — AIOPR — EC — DXCC — CLUBS — RM — OPS — RCC —

• All operating amateurs are invited to report to the SCM on the first of each month, covering station activities for the preceding month. Radio Club news is also desired by SCMs for inclusion in these columns. The addresses of all SCMs will be found on page 6.

ATLANTIC DIVISION

EASTERN PENNSYLVANIA — SCM, Clarence Snyder, W3PYF — SEC: NNT. RM: AXA. PAM: TEJ. E. Pa. Nets: 3610 and 3850 kc. New club officers announced by the Harrisburg Radio Amateur Club are VDA, pres.; YMH, vice-pres.; TMN, secy.; ADE, treas. Delaware-Lehigh ARC new officers are CBN, pres.; ZOM, vice-pres.; ZBE, secy.; QBF, treas.; and NF, act. mgr. The North Penn Amateur Radio Club reports PNL, pres.; VST, vice-pres.; WN3ZXV, secy.; and VTR, treas. This new club now boasts 98 members and still is growing. WUE made BPL for the first time. TEJ is the new E. Pa. PAM. NNT is the new SEC. BAC is now General Class and an OES. TTW has a new B&W 5100. ABT, at U. of P. ARC, had closed circuit TV and message-handling at the Annual Engineers and Architects Day. UKJ and her dad, UKF, are on a three-month vacation in Chile. The Eastern Pennsylvania C.D. Phone Net had a dinner at Bethlehem on May 7th. UA, State Radio Officer, was the main speaker. TEJ is looking for new members for PFN. The Net meets Mon. through Fri. at 1815 EDT. YDX was very active during the Mother's Day message rush and used a wire recorder to copy messages to speed up air time and transcribed them later. YA, ADF, BN, and MLY were present at the signing of the license plate bill by Gov. Leader. May 1 take this opportunity to thank Bill, BIP, for the good job he has done as SCM and for the cooperation he has given me in this new job. QOL is building a new kw., rockbound on 3850 kc., the PFN frequency. UQJ worked AJD on 220 Mc. for AJD's first contact on that band. BIP, now in retirement, is building a new shack and will be running high power by fall. Philadelphia received approval of the State Plan for RACES on May 10th. UA reports that the Cumberland County Plan also has been approved by FCDA and FCC and will be used as a model plan by other counties. The Tamaqua ARC holds code instruction every night at 7:00 P.M. PVY was elected manager of the AN Net for the fourth year. The Pennsylvania Phone Net will picnic at Hershey Park on August 14th. E. Pa. C.W. Net will picnic on the same day at a place to be announced. Traffic: W3CUL 1549, WUE 505, YDX 412, OK 214, TEJ 139, OZV 115, BNR 95, VVV 81, AXA 77, DUI 66, PYF 47, UWP 46, ABT 37, TAW 35, ELI 26, VOE 18, PVY 16, EAN 14, TTW 14, QLZ 12, YGX 12, JNQ 3, ADE 2.

MARYLAND-DELAWARE-DISTRICT OF COLUMBIA — SCM, John W. Gore, W3PRL — WG and his family more than likely would take first place as a ham family in this area. The members of the family holding Novice calls are XYL, Peggy, ZQF; Freddie, 17, ZQL; Margit, 14, ZTE; Candy, 12, ZVE; Mike, 10, ZVD. It is expected that general calls will be acquired during the school holidays. The only other member of the family, Chris (6), has been subjected to all the dis-fishing around the house by his brothers and sisters and has inhaled half the Morse alphabet and may be ready for a Novice ticket by the time he starts school in the fall. Governor McKeldin proclaimed the week of June 19-25 "Amateur Radio Week" for the State of Maryland. MTE describing "Wavemeters" on May 9th and JCI advising as to "Some uses for O-1 MA Meters" on May 23rd were the programs of the CARC, Baltimore. EQK presented film showing his Florida and Havana trip at the BARC meeting May 2nd. QZC is headed for Emory University in Georgia to study medicine and acquire a W4 call. UCR, at Aberdeen, acted as NCS for communications for the Convoy from Aberdeen to Baltimore on Armed Forces Day. 5ZOG-M/3 was stationed at Sheridan Armory; 8CPN-M/3 and 9OKI-M/3 were at Turner Armory; NNX and 5HOF-M/3 also participated. NNX acting as relay between the mobiles and Aberdeen. EQK was operated upon on the Tuesday after Easter. His convalescent period provided ample time for hamming, checking the transmitter, renewing tubes, with time out for a week's visit to

Ocean City, etc. RV reports the AEA Windbay Net started operation on 50.4 Mc. June 15th, shifting from 7240 kc. BKE would like schedules. He can handle traffic into Washington. ECP reports that the Washington TVI Committee shortly will release a film project which uses the REA film "Typical Television Interference Patterns" with an introduction by George E. Sterling, DF/IAE, a former member of the FCC. The Washington Radio Club code class, which held its last meeting May 26th, resulted in Novice license qualification by 100 per cent of the group that completed the course, 60 per cent of which started the course last October. K3WBJ, Walter Reed Army Medical Center, now has two operators assigned full time, 1-SDO and 1-RKB. COK has at last worked his first JA and needs only two more cards to make DXCC. OYX, OXL, AKX, TJV, YRK, and VAM/M participated in the CD Test "Operation Frederick Fireball" held May 15th. ZGN and AKU, of Frederick, have graduated to General Class, ZGN with perfect copy for his 5-minute code test. Traffic: (May) W3WG 1377, WV 638, K3WBJ 560, W3UE 319, COK 155, RV 96, PKC 66, ECP 43, PQ 29, BUD 8, NNX 6, OYX 4, BKE 3, WKB 2. (Apr.) W3WG 661, CVE 238, TMZ 22, UCR 12, NNX 8, MCD 6, CDG 2.

SOUTHERN NEW JERSEY — SCM, Herbert C. Brooks, K2BG — SEC: W2ZVW. PAM: ZI. YRW now is manager of the Delaware Valley 2-Meter Net. Wes also set up amateur equipment at the Philadelphia Electric Co. Hobby Show and handled traffic from the visitors. New Jersey Net (80-meter c.w.) members are planning a picnic for this summer. EAS is net manager. K2HZR is working hard trying to make WAS on 40 meters. Congratulations to K2CPR on having received the BERTA (British Empire DX Award), also WBE. Jack also is an Official Observer. ZVW is rebuilding between skeds. The Camden County (Area 11) RACES station has been put into operation and tests have been made with the Burlington County (Area 10) station. RG is Radio Officer of the Camden station and UA is RO of Area 10. Congratulations to the Tri-City Amateur Radio Club on becoming an ARRL affiliated club. We look forward to reporting the Club's activities each month in this column. K2CEF, reporter of the Southern Counties Radio Assn. news, is being transferred to the Naval Air Tech. Training Center, Memphis, Tenn. SDO recently erected an 8JK antenna. 3SOB expects to be a W2 soon. K2BWG is headed for Japan. Good luck, Cliff. Scuttlebutt, the Hamilton Twp. Radio Assn. news, reports plenty of building. Special mention is made of BDA, BDK, EWS, CFP, and BMX. A Section Net certificate has been issued to SUG, Milford. UKS is Chief RO on the 88 North American. Look for Bill operating RM. K2INQ is operating 2-meter mobile. We wish HAZ a speedy and complete recovery from his recent operation. Traffic: W2RG 168, YRW 112, ZVW 80, K2HZR 55, BG 19, W2ASG 9, ZI 9, K2CPR 7.

WESTERN NEW YORK — SCM, Edward G. Graf, W2SJV — Asst. SCM: Jeanne Walker, 2BTD. SEC: UTH/FRL. RM: RUF. PAMS: NAI and TEP. NYS meets on 3616 kc. at 6 P.M. and 6:30 A.M.; NYSS on 3595 kc. at 5:30 P.M.; NYS on 3925 kc. at 6 P.M.; NYS C.D. on 3509.5 and 3993 kc. at 9 A.M. Sun.; TCPN 2nd Call Area on 3970 kc. at 7 P.M.; SRPN on 3970 kc. at 10 A.M.; ISPN on 3980 kc. at 3 P.M. The W.N.Y. Hamfest, sponsored by the RARA, was one of the most successful with 476 in attendance. The AREC meeting was addressed by RUF, mgr. NYS C.W.; AQY, asst. mgr. NYS Phone; ZOL, representing TCPN; with UTH, the SEC, as M.C. At a meeting in Syracuse, called by the Onondaga Co. EC, CYD, a Red Cross Amateur Radio Net for Central New York was organized, comprising the counties of Cortland, Cayuga, Oswego, Jefferson, Oneida, Madison, and Onondaga. The following were in attendance: BCK, RIP, JNM, QVQ, RUT, UNO, ZHU, K2s DXP, DYB, CNR, FAA, FCD, and DUR. CYD, SZG, JPO, YEU, and K2KGQ represented CRD, the amateur station of the Red Cross. More stations are needed, especially in Jefferson Co. The Net will operate on 3925 kc. at 8:00 P.M. the 1st Mon. of each month. Officers of the Batavia Area are HJN, pres.; IIE, vice-pres.; K2DVC, secy. and comm. ch.; TON, treas. YGW has the call K2LSF for a second location. K2EVP reports K2GNG now is located at Fort Meade, Md. The power now is 60 watts at K2CLA. The RAWNY board meeting was held at the QTH of K2DJN. NYS Phone Net Mgr. TEP compiled the first issue of the Net sheets *Zero Beat*. EMW's DX now is 202 worked and 193 confirmed. Erie Co. C.D. issues a monthly bulletin edited by DVD. HVZ will continue to manage the A.M. session of NYS C.W. from Lake Placid for the summer and from college in the fall. The Elmira ARA meeting was devoted to FD planning. RZP, PFY, and HXG renewed as EC. Thanks to IEP for

issuing the FB roster of the NYS 'Phone Net. Officers are TEP, net mgr.; AQY, asst. mgr.; NJL, net secy. QLI is busy rebuilding glass-melting units at Corning. After an absence of 18 years, ex-ICJ is back on an SSJ at Niagara Falls using a Viking II and an SX-96. Officers of the new Radio Amateurs of Greater Syracuse (RAGS) are RWJ, pres.; KUD, vice-pres.; ZCZ, secy.; TEB, treas. Former Rocky Mt. Director now is located at Potsdam with the call BB. The Otsego Co. AREC Net on 29.6 Mc. is monitored and/or operated 15 hours daily with one or more guard units on duty. AREC C.D. of Oneida Co. was very active in the April 30th test. The Rome Radio Club emergency unit, which is a converted school bus, now is in operation with 6 operating positions, a Viking II, 2-, 6-, and 10-meter units. The net frequency is 3905 kc. Congrats to the Watertown Club, now an ARRL affiliate. CXM has been appointed OPS. Net Certificates were issued to EEB, BWK, DYB, and K2s DIO and HOS. Traffic: W2RUF 409, K2CLA 362, W2ZRC 304, HKA 251, K2DJN 177, W2CXM 131, K2DSR 123, LSF 84, W2OE 64, OZR 57, K2HVZ 48, W2EMW 42, ZLT 39, DSS 26, RUT 21, SJV 14, FEB 13, UTH 7, K2AHH 6.

WESTERN PENNSYLVANIA—SCM, R. M. Heck, W3NCD—SEC: GEG. RMs: UHN, NUG, NRE, and GEG. PAMs: AER and VKD. Altoona items courtesy of KQD: The Muleshoe Radio Club classed under KQD produced the following new hams: WNs ZUF, BMU, CHO, and W3ZKM, ZUG, ZVA, and AFH. ZVA has a kw, and ZUG is mobile. The Horse Shoe Radio Club classed produced the following new hams: WNs BKV, BSR, BVE, BZN, BTX, and AUD, with LQD as tutor. KFD, the president of HRC, has gone mobile. LQD has loaned out 5 transmitters to Novices. UHM, almost mobile, and OUA are working on Scott Township c.d. outfit. ZDW is working 20-meter DX, OKU is s.a.b. on 40 meters. UUH is working 10 meters and putting finishing touches on mobile installation. The SCARC station now has 2- and 6-meter beams up. WII is on 10 meters, VEF is mobile. IMCA, formerly 3TMA, is on 3525 kc. week ends, TCP is radio-activating model airplanes. PTU is on the Commuters Net with RMX and others. On 10 meters we find RLH, SUL, and IIX. TYC still is with YLRL *News and Nets*. The Penn Central Radio Club of Falls Creek is an ARRL affiliate. The Breeze Shooters Hamfest was enjoyed by all. The SHBPM outfit was at South Park for Field Day. New rig: RYK has a BW 5100, KHL a Heath DX100. We find W3GCGP, MWG, KYC, BDW, and UJP working on antennas. UVD says the Weather Net now has 15 members. However, he could use help from Warren, Pa., and Olean, N. Y. If interested contact him via W. Pa. Net 3585 kc. at 6:30 p.m. The Indiana Amateur Radio Club operated on Field Day using club station call BMD. VKD says the 20-meter band is giving the DX fellow a break these days. Ed Balogh, formerly of Indiana, now is 6VHC. The West Able C.D. Net is getting regular attendance from those using State-owned power plants. The West Charlie Net is getting off to a good start. KA2DV/W3WTW is back in the States. VKD received first place award for W3 in the VK/ZL 1954 Fall Contest. VKD was visited by 8DQ, of Akron, who now is on all bands using a new Johnson KW. At a recent Radio Association of Erie meeting a pocket-sized 10-meter receiver was demonstrated by MED. YWL says his son YMW, Grove City, College, has been working back home on 75 meters. NXK has a new Elmac for mobile. Recently visiting in Erie were 8BQO, 4BHN, and 8BKM. The untimely death of GV comes as a shock to his many friends. The newly-elected directors of the RAE are Doc Sheldon and Bart Geer. WDK and YKE now have DX100 kits. OIH now has new Morrow converter. Mercer County Radio Association members who turned out in the recent nationwide Civil Defense Test were QHS, VK, SYZ, YEW, and GEG. Traffic: (May) W3WJU 2757, LXQ 96, YA 49, UHN 42, TAW 35, NUG 24, KNQ 19, VKD 11, NCD 10, KUN 3. (Apr.) W3NUG 15. (Mar.) W3NUG 26.

CENTRAL DIVISION

ILLINOIS—SCM, George T. Schreiber, W9YIX—Section nets: ILB c.w., 3515 kc. Mon. through Sat.; IEN 'phone, 3940 kc. RMs: BUK and MRQ. PAM: UQT. EC: HOA. EC Cook County: HPG. Congratulations to LOY and YBC, elected respectively to the national presidency and vice-presidency of the YLRL. Only three made BPL this month: DO, c.w.; and IDA and YWL, 'phone. YWL made it for the third month in a row. Nice going, fellows. Incidentally, there are new grandsons for DO and VHD. And while the congratulations are being passed out, flowers to HYK, who celebrated his 82nd birthday, and to WPY, who is a young 76. A new ORS this month is ZMJ. EC for Schuyler County is BII; for Rock Island and Mercer County RYU; Mason, VBH, and Hancock OXS. The Nomad Net of MARS has been reactivated with the following reorganizing members: VEZ, JGL, KHJ, MRK, QAO, ZGX, LSQ, DEI, RHN, EXG, and SH. The Net meets on 27,994 kc. Wed. at 10 p.m. Central Time. ITM and QMO now are members of the U. S. Coast Guard Auxiliary. Lightning struck the antenna of HUX and caused severe damage to both the transmitter and receiver. USI is pleased with the increasing activity on 6 meters. CSW

tells us the North Central 'Phone Net completed two years on the air in May and rolled up a traffic total for the month of 531 messages. NIU is mourning the storm damage to a tree that held his antenna and moans the fact he now will have to put up a stick. Congrats to OQI and his XYL, UXL, on their new son, Stephen; and additionally to UXL, who finally worked her 48th state, Wyoming. The OM has only 47 at this writing. CLH tells us he is on all bands 160- to 10-meter 'phone and c.w. PCF plans a cubical quad as a summer project and also a three-band vertical to try and snatch some of those rare ones from GDI, his neighbor. New calls heard are Novices UGA, YNI, and ZOR; Technical NAX; and General FCC. No, he is not an R.I. The Kankakee Novice Net meets at 2100 Daylight Time Mon. through Sun. on 3735 kc. Present members are WNS, OUS, NAX, YNI, ZOR, TBX, and TXH. The St. Clair County Amateur Radio Club issued 10-contact certificates to KUJ and Novice OAN. UWP has an Elmac in his car and enjoys mobile. RSY and RSZ, father and son, have a new NC-125 on their operating table. BPU spent a well-earned vacation in the Southland visiting some of the ham friends he has worked these many years. The summer slump in news seems to have set in, fellows; send in your items by the fifth of the month. Watch for the announcement soon of the Illinois QSO Party. Traffic: W9DQ 1428, YWL 855, IDA 617, CSW 250, AA 149, YIX 55, VHD 50, BUK 47, V8X 43, SME 41, CEE 38, STZ 35, USI 34, QQG 31, ZMJ 31, CZB 28, CTZ 26, VEY 25, LXJ 19, OVB 18, OR 17, FRP 14, PHE 13, MRQ 10, LL 8, BA 2, UVM/9 2, KLD 1. (Apr.) W9UCM 7.

INDIANA—SCM, George H. Graue, W0BKJ—Communications for the Armed Forces Parade in Evansville were handled by RACES members. FJL, ABW, and LBD assisted in a Boy Scout Camporee radio demonstration at Garvin Park. BKJ and EOG furnished communications for Anthony Wayne Council, Boy Scouts, at its annual Camporee at Columbia City. PMT and FMJ assisted in Ft. Wayne. More than 1500 boys made up the tent city. Code practice was sent by FMJ and several boys made perfect copies. ZHJ has joined the Marines. NTR is leaving for Texas for the summer. WUH is the new Vanderberg County EC. New at Vincennes are N9RFA, NSN, VSD, YSH, and VZK. DIR received appointment to the Air Academy at Denver. 6PKM, ex-9NEC, visited Evansville. EHU again was winner of the hidden transmitter hunt. TARS will award a DX-100 transmitter at the annual hamfest Aug. 28th. MOC/KL7 and SCX/V06 can be contacted on 20-meter 'phone. EQQ, EQO, and NTA are the proud possessors of the A-1 Operators Award. CAEN reports 22 sessions with a traffic total of 41. WWT reports for RFN with a traffic total of 175. IFN Net, as reported by NTA, had 53 sessions and traffic total of 239. MARC members SHW, DDA, BRM, NAR, EZS, and YRF assisted in the Armed Forces Day Parade in South Bend. SMW has a DX-100. ZHJ has a new Viking Ranger. ZDS is being transferred to New Orleans. MAM overhauled the club's 2½-kw. power plant. TT has a new telephone pole for a mast. BKJ's old rig is no more. VNV and KDV are taking a two-month cruise on the Mediterranean Sea. EQO is building an s.a.b. exciter. CEA is a new ORS. NTR has a new 75A-4 receiver. EHU made DXCC. DKR is on 1.9-Mc. mobile. UTU won the phone SS award for this section. NH is rebuilding again. AYD has a Viking mobile installation. JUJ's report was not received after making BPL 48 consecutive times. Traffic: W9NZZ 1029, TT 707, WWT 420, UQP 182, EHJ 142, BKJ 131, ZYK 116, STC 85, WBA 85, DHJ 83, CTF 81, NTA 70, QYQ 62, TQC 58, VNV 48, PQA 47, SKP 42, HRY 39, DOK 36, SVL 29, AZF 24, CMT 24, WRO 24, WUH 20, ALL 19, CEA 18, TG 17, EQO 16, CC 14, GDL 13, ZIB 13, BDP 12, YVS 11, QR 10, HSG 5, NTR 5, FGX 4, PIN 4, DKR 3, KDV 3, UTL 3, NH 2, PPI 1.

WISCONSIN—SCM, Reno W. Goetsch, W9RQM—SEC: OVO. PAMs: ESJ and GMY. RMs: IXA and RTP. Nets: WIN, 3685 kc., 7 p.m. daily; BEN, 3950 kc., 6 p.m. daily; WPN, 3950 kc., 1215 Mon.-Sat., 0930 Sun. Wisconsin mobile and c.d. frequency: 29,620 kc. CXY participated in Armed Forces Day with QSOs with WAB, AIR, and NSS. FFC received his 20-w.p.m. Code Proficiency certification. DVM worked 8 states with his Ranger loaded up to his screen window! CCO received a QSL from ZL2FL. CHD is on 14 Mc. HDQ, GZS, and CDD are going to give 50 Mc. a whirl. ZLD is president of UW Ext. Club. HAT is mobile on 4 Mc. AJU's dad WN9VFO and sister WN9VFP are new calls in Ashland. AJU takes over as WPN mgr., replacing SAA, who is QRL with other duties. DIK has a new Heathkit VFO. IUU reports the Polecats well represented at the Monroe Hamfest. IAL has a new NC-240D. KKK is shopping for a new 20-meter beam since a wind-storm blew down his old one. ECs KTE, REQ, and IYF are promoting activities on 29,620 kc. HDH is rebuilding. ONY has worked 14 countries from mobile. GHG has a Viking II and an S-76. After an absence of 20 years, KNP is back in Milwaukee on s.a.b. with an 813 and HRO-50T w/alter. LDH and DJE are active on RTTY. FAF and YVO are active on 7-Mc. 'phone. YZA worked WAC in 4 days using a Viking II and a 44-ft. vertical. Congrats to HQT, who has a new baby girl. OLW is on with a Viking

(Continued on page 78)

Tee-Notch Filters



MANY times in a ham shack or in the laboratory, occasion arises for the need of a simple circuit which can be used to "null out" or "notch out" a very narrow band of frequencies. For example, at audio frequencies if an amplifier were fed with a 400 C.P.S. input signal, if at the output we could trap out the 400 C.P.S., the remaining audio power present would be the harmonics of the original 400 C.P.S. and thus would be had a simple and effective distortion factor meter.

A BRIDGED tee network that performs this function has been available for a number of years and has been used at audio and also r.f. frequency to at least as high as 50 Mc.

WE at Hallicrafters prefer to call it a tee-notch filter and we use it for all sorts of trap circuits around the plant and in the laboratory and also find it very effective to trap the fundamental output of a transmitter to measure the remaining total harmonics.

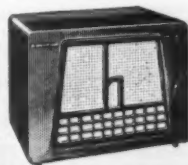
ONE fine feature of this network is that its insertion loss is reasonable, about 3 db at 50 kc., and also, its suppression of the desired frequency may be as much as 60 db. It's simple, stable, and normally does not require any tubes if the circuit to which it is added has 3 db. of reserve gain.

WE feel that this tee-notch filter has many advantages in receivers and for those of you that want more detail a data sheet has been prepared. A postal or QSL card addressed to me will insure that you will receive one of these sheets.

—Fritz Franke

Bill Halligan, Jr. *W. J. Halligan W9AC*

for **hallicrafters**



Ack Radio Supply Co.
3181 Fourth Avenue S.
Birmingham 3, Alabama

Radio Parts of Arizona
214 S. 11th Street
Phoenix, Arizona

Lavender Radio Supply Co., Inc.
P.O. Box 596, 520 E. 4th Street
Texarkana, Arkansas-Texas

Valley Electronic Supply Co.
1302 W. Magnolia Blvd.
Burbank, California

Larry Lynde Electronics
1826 E. 4th Street
Long Beach, California

Frank Quement, Inc.
P.O. Box 527
San Jose, California

Radio Products Sales Co.
1237 16th Street
Denver 2, Colorado

Dale Electronic Distributors
150 James Street
New Haven 13, Connecticut

Wilmington Electrical Spec.
Co., Inc.
405 Delaware Avenue
Wilmington 9, Delaware

Radio Elec. Serv. Co. of Pa., Inc.
S.E. Corner 3rd & Tatnall Streets
Wilmington 40, Delaware

Specialty Dist. Co.
425 Peachtree St., N.E.
Atlanta 3, Georgia

Specialty Dist. Co.
644 Reynolds Street
Augusta, Georgia

Specialty Dist. Co.
1541 15th Street
Savannah, Georgia

Newark Electric Co.
223 W. Madison Street
Chicago 6, Illinois

Allied Radio Corp.
100 N. Western Avenue
Chicago 80, Illinois

Radio Distributing Co.
432 Carroll Street
South Bend 4, Indiana

World Radio Laboratories, Inc.
3415-27 W. Broadway
Council Bluffs, Iowa

TCR Distributors, Inc.
1205 E. River Drive
Davenport, Iowa

Radio Trade Supply Co.
1224 Grand Avenue
Des Moines 9, Iowa

Ken-Els Radio Supply Co.
501 First Avenue, No.
Fort Dodge, Iowa

these Collins Distributors sell SSB SUPERIORITY-*Collins*

Collins 96 Amateur distributors throughout the country are selling the finest in SSB gear, assuring you of the *best* performance, the *most* for your money. The KWS-1, most versatile kilowatt Transmitter ever offered, features greatly reduced distortion, selectable sidebands and operation on SSB, AM and CW. The 75A-4 Receiver features passband tuning, a mixer-type SSB detector, rejection tuning, and AVC on SSB, AM and CW. For complete information on this brand new line, write or visit the distributor nearest you.

Kierulff & Co.
820-830 W. Olympic Blvd.
Los Angeles 15, California

Henry Radio
11240 W. Olympic Blvd.
Los Angeles 25, California

Elmar Electronics
140 11th St. at Madison
Oakland 7, California

Western Radio & TV Supply Co.
1415 India Street
San Diego 1, California

San Francisco Radio & Supply Co.
1282-1284 Market Street
San Francisco 2, California

Electronic Wholesalers, Inc.
2345 Sherman Avenue, N.W.
Washington 1, District of
Columbia

Kinkade Radio Supply
1402 Laura Street
Jacksonville, Florida

Electronic Supply Co.
61 N.E. 9th Street
Miami 32, Florida

Walder Radio & Appliance Co.
1809 N.E. Second Avenue
Miami 32, Florida

Kinkade Radio Supply
1707 Grand Central Avenue
Tampa, Florida

Klaus Radio & Electric Co.
707 Main Street
Peoria, Illinois

Ft. Wayne Electronics Supply,
Inc.
223 E. Main Street
Ft. Wayne, Indiana

Graham Electronics Supply, Inc.
102 S. Pennsylvania Street
Indianapolis 4, Indiana

Lafayette Radio Supply, Inc.
627 Main Street
Lafayette, Indiana

Muncie Electronics Supply, Inc.
305 N. Madison
Muncie, Indiana

The Overton Electric Co., Inc.
522 Jackson Street
Topeka, Kansas

Radio Equipment Co.
480 Skain Avenue
Lexington, Kentucky

Radio Parts, Inc.
807 Howard Avenue
New Orleans 12, Louisiana

Kann-Ellert Electronics, Inc.
9 S. Howard Street
Baltimore 1, Maryland

DeMambro Radio Supply, Inc.
1095 Commonwealth Avenue
Boston 15, Massachusetts

M. N. Duffy & Co.
2040 Grand River Ave., W.
Detroit 26, Michigan

Warren Radio Co.
713 Portage Street
Kalamazoo, Michigan

Lew Bonn Co.
228 E. Superior Street
Duluth 2, Minnesota

Lew Bonn Co.
1211 LaSalle Avenue
Minneapolis 3, Minnesota

Hall Electric Co.
566 N. Robert Street
St. Paul 1, Minnesota

Electronic Supply
214 11th Street, W.
Billings, Montana

Evans Radio
Bow Junction, Route 3A
Concord, New Hampshire

Radio Elec. Serv. Co. of Pa., Inc.
452 N. Albany Avenue
Atlantic City, New Jersey

Radio Elec. Serv. Co. of Pa., Inc.
513-15 Copper Street
Camden, New Jersey

Ft. Orange Radio Dist. Co., Inc.
642-644 Broadway
Albany 7, New York

Electronic Laboratories & Supply Co.
1415 Oriskany Street, West
Utica 4, New York

Johannesen Electric Co., Inc.
312-14 N. Eugene Street
Greensboro, North Carolina

Dalton-Hegn Radio Supply Co., Inc.
824 West 4th Street
Winston-Salem, North Carolina

Olson Radio Warehouse, Inc.
275 E. Market Street
Akron 8, Ohio

Steinberg's Inc.
833 Walnut Street
Cincinnati 2, Ohio

Radio & Electronic Parts Co.
3235 Prospect Avenue
Cleveland, Ohio

Universal Service
114 N. 3rd Street
Columbus, Ohio

SREPCO, Inc.
314 Leo Street
Dayton 4, Ohio

SREPCO, Inc.
119 W. Main Street
Springfield, Ohio

Selectronic Supplies, Inc.
1320 Madison Avenue
Toledo 2, Ohio

Radio, Inc.
1000 S. Main Street
Tulsa, Oklahoma

Portland Radio Supply Co.
1234 S.W. Stark Street
Portland 5, Oregon

Radio Elec. Serv. Co. of Pa., Inc.
1842 Hamilton Street
Allentown, Pennsylvania

Radio Elec. Serv. Co. of Pa., Inc.
916 Northampton Street
Easton, Pennsylvania

Cambria Equipment Co.
17 Johns Street
Johnstown, Pennsylvania

Radio Elec. Serv. Co. of Pa., Inc.
N.W. Corner of 7th & Arch Sts.
Philadelphia 6, Pennsylvania

Radio Elec. Serv. Co. of Pa., Inc.
3412 Germantown Avenue
Philadelphia 40, Pennsylvania

Cameradio Co.
1211 Penn Avenue
Pittsburgh 22, Pennsylvania

The George D. Barbey Co.
155-157 Penn Street
Reading, Pennsylvania

Burghardt Radio Supply
P.O. Box 342
Aberdeen, South Dakota

Burghardt Radio Supply
P.O. Box 41
Watertown, South Dakota

Curle Radio Supply
439 Broad Street
Chattanooga 2, Tennessee

L. K. Rush Co.
P.O. Box 1418
Jackson, Tennessee

W & W Distributing Co.
644-646 Madison Ave.
P.O. Box 436
Memphis, Tennessee

The Hargis Company
P.O. Box 716, 706 W. 6th Street
Austin, Texas

Electronic Equip. & Engrg. Co.
805 S. Staples Street
Corpus Christi, Texas

Crabtree's Wholesale Radio
2808 Ross Avenue
Dallas, Texas

C. C. McNicols
811 Estrella
El Paso, Texas

Busacker Electronic Equip. Co.
1216 W. Clay Street
Houston 19, Texas

Lamp's 'Electronics Ltd.
P.O. Box 5066
Beacon Hill Station
San Antonio, Texas

Iverson Radio Co.
265 25th Street
Ogden, Utah

Standard Supply Co.
P.O. Box 1047
225 E. 6th St. Street
Salt Lake City 1, Utah

Radio Equipment Co.
821 W. 21st Street
Norfolk, Virginia

C & G Radio Supply Co.
2502-6 Jefferson Avenue
Tacoma 2, Washington

Satterfield Electronics, Inc.
326 W. Garham Street
Madison 3, Wisconsin

Central Radio Parts Co.
1723 W. Fond du Lac Avenue
Milwaukee 5, Wisconsin

Lew Bonn Co.
141-147 W. 7th Street
St. Paul 2, Minnesota

Swan Distributing Co., Inc.
342 North Gallatin Street
Jackson, Mississippi

Henry Radio
221 North Main
Butler, Missouri

Radiolab
1812 Grand Avenue
Kansas City 8, Missouri

Walter Ashe Radio Co.
1125 Pine Street
St. Louis 1, Missouri

Adirondack Radio Supply
185-191 W. Main Street
Amsterdam, New York

Genesee Radio & Parts Co.
2550 Delaware Avenue
Buffalo 16, New York

Harrison Radio Corp.
144-24 Hillside Avenue
Jamaica 35, New York

Harrison Radio Corp.
225 Greenwich Street
New York 7, New York

Harvey Radio Co., Inc.
183 W. 43rd Street
New York 18, New York





New Heathkit VFO KIT

MODEL VF-1

\$1950

Ship. Wt. 7 lbs.

- Smooth acting illuminated and precalibrated dial.
- 6AU6 electron coupled Clapp oscillator and OA2 voltage regulator.
- 10 Volt average output on fundamental frequencies.
- 7 Band calibration, 160 through 10 meters, from 3 basic oscillator frequencies.

Open layout—easy to build—simplified wiring.

Smooth acting illuminated dial drive.

Clean appearance—rugged construction—accessible calibrating adjustments.

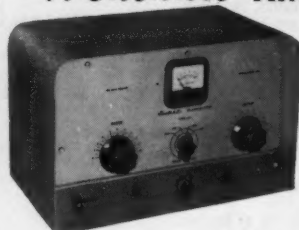
Ceramic coil forms—differential condenser.

Copper plated chassis—careful shielding.

and electrical design insures operating stability. Coils are wound on heavy duty ceramic forms, using Litz or double cellulose wire coated with polystyrene cement. Variable capacitor is of differential type construction, especially designed for maximum bandspread and features ceramic insulation and double bearings.

This kit is furnished with a carefully precalibrated dial which provides well over two feet of calibrated dial scale. Smooth acting vernier reduction drive insures easy tuning and zero beating. Power requirements 6.3 volts AC at 45 amperes and 250 volts DC at 15 mills. Just plug it into the power receptacle provided on the rear of the AT-1 Transmitter Kit. The VFO coaxial output cable terminates in plastic plug to fit standard 1/4" crystal holder. Construction is simple and wiring is easy.

Heathkit AMATEUR TRANSMITTER KIT



MODEL AT-1

\$2950

Ship. Wt. 16 lbs.

SPECIFICATIONS:

Range 80, 40, 20, 15, 11, 10 meters.
6AG7 Oscillator-multiplier.
6L6 Amplifier-doubler
5Y4G Rectifier.
105-125 Volt A.C. 50-60 cycles 100 watts. Size: 8 1/2 inch high x 13 1/2 inch wide x 7 inch deep.

Crystal or VFO excitation.

Prewound coils—metered operation.

52 ohm coaxial output.

Rugged, clean construction.

Single knob band switching.

Built-in power supply.

Here is a major Heathkit addition to the Ham radio field, the AT-1 Transmitter Kit, incorporating many desirable design features at the lowest possible dollar-per-watts price. Panel mounted crystal socket, stand-by switch, key click filter, A. C. line filtering, good shielding, etc. VFO or crystal excitation—up to 35 watts input. Built-in power supply provides 425 volts at 100 MA. Amazingly low kit price includes all circuit components, tubes, cabinet, punched chassis, and detailed construction manual.

Heathkit COMMUNICATIONS RECEIVER KIT

Four band operation 535 to 35 Mc.

Six tube transformer operation.

Stable VFO oscillator circuit.

Electrical bandspread and scale.

RF gain control with AVC or MVC.

5 1/2 inch PM Speaker-Headphone Jack.

Noise limiter—standby switch.

SPECIFICATIONS:

Range.....535 Kc to 35 Mc
12BE6 Mixer-oscillator
12BA6 I. F. Amplifier
12AV6 Detector—AVC—audio
12RA6 B. F. O. oscillator
12AG6 Beam power output
5Y3GT Rectifier
105-125 volts A.C. 50-60 cycles, 45 watts.

A new Heathkit AR-2 communications receiver. The ideal companion piece for the AT-1 Transmitter. Electrical bandspread scale for tuning and logging convenience. High gain miniature tubes and IF transformers for high sensitivity and good signal to noise ratio.

Construct your own Communications Receiver at a very substantial saving. Supplied with all tubes, punched and formed sheet metal parts, speaker, circuit components, and detailed step-by-step construction manual.

MODEL AR-2

\$2550

Ship. Wt. 12 lbs.

CABINET:

Proxylon impregnated fabric covered plywood cabinet. Ship. weight 5 lbs. Number 91-10, \$4.50.

HEATH COMPANY
BENTON HARBOR 9, MICHIGAN

New **HEATHKIT
DX-100**

PHONE AND CW TRANSMITTER KIT



MODEL DX-100

Shpg. Wt. 120 lbs.

\$189⁵⁰

Shipped motor freight unless
otherwise specified. \$50.00
deposit with C.O.D. orders.

- R.F. output 100 watts Phone, 125 watts CW.
- Built-in VFO, modulator, power supplies. Kit includes all components, tubes, cabinet and detailed construction manual.
- Crystal or VFO operation (crystals not included with kit).
- Pi network output, matches 50-600 ohms non-reactive load. Reduces harmonic output.
- Treated for TVI suppression by extensive shielding and filtering.
- Single knob bandswitching, 160 meters through 10 meters.
- Pre-punched chassis, well illustrated construction manual, high quality components used throughout—sturdy mechanical assembly.

This modern-design Transmitter has its own VFO and plate-modulator built in to provide CW or phone operation from 160 meters through 10 meters. It is TVI suppressed, with all incoming and out-going circuits filtered, plenty of shielding, and strong metal cabinet with interlocking seams. Uses pi network interstage and output coupling. R.F. output 100 watts phone, 125 watts CW. Switch-selection of VFO or 4 crystals (crystals not included).

Incorporates high quality features not expected at this price level. Copper plated chassis—wide-spaced tuning capacitors—excellent quality components throughout—illuminated VFO dial and meter face—remote socket for connection of external switch or control of an external antenna relay. Preformed wiring harness—concentric control shafts. Plenty of step-by-step instructions and pictorial diagrams.

All power supplies built-in. Covers 160, 80, 40, 20, 15, 11 and 10 meters with single-knob bandswitching. Panel meter reads Driver I_p , Final I_a , I_f , and E_p , and Modulator I_p . Uses 6AU6 VFO, 12BY7 Xtal osc.-buffer, 5763 driver, and parallel 6146 final. 12AX7 speech amp., 12BY7 driver, push-pull 1625 modulators. Power supplies use 5V4 low voltage rect., 6AL5 bias rect., 0A2 VFO voltage reg., (2) 5R4GY hi voltage rect., and 6AQ5 clamp tube. R.F. output to coax. connector. Overall dimensions 20 $\frac{3}{4}$ " W x 13 $\frac{3}{4}$ " H x 16" D.

Heathkit GRID DIP METER KIT



MODEL GD-1B

\$19⁵⁰ Ship. Wt.
4 lbs.

The invaluable instrument for all Hams. Numerous applications such as pretuning, neutralization, locating parasitics, correcting TVI, adjusting antennas, design procedures, etc. Receiver applications include measuring C, L, and Q of components—determining RF circuit resonant frequencies.

Covers 80, 40, 20, 11, 10, 6, 2, and 1 $\frac{1}{2}$ meter Ham bands. Complete frequency coverage from 2—250 Mc, using ready-wound plug-in coils provided with the kit. Accessory coil kit, Part 341-A at \$3.00 extends low frequency range to 350 Kc. Dial correlation curves furnished.

Compact construction, one hand operation. AC transformer operated, variable sensitivity control, thumb wheel drive, and direct reading calibrations. Precalibrated dial with additional blank dials for individual calibration. You'll like the ready convenience and smart appearance of this kit with its baked enamel panel and crackle finish cabinet.

Heathkit ANTENNA COUPLER KIT



MODEL AC-1

\$14⁵⁰ Ship. Wt.
4 lbs.

Poor matching allows valuable communications energy to be lost. The Model AC-1 will properly match your low power transmitter to an end-fed long wire antenna. Also attenuates signals above 36 Mc, reducing TVI. 52 ohm coax. input—power up to 75 watts—10 through 80 meters—tapped inductor and variable condenser—neon RF indicator—copper plated chassis and high quality components.

Heathkit ANTENNA IMPEDANCE METER KIT



**MODEL
AM-1**

\$14⁵⁰ Ship. Wt.
2 lbs.

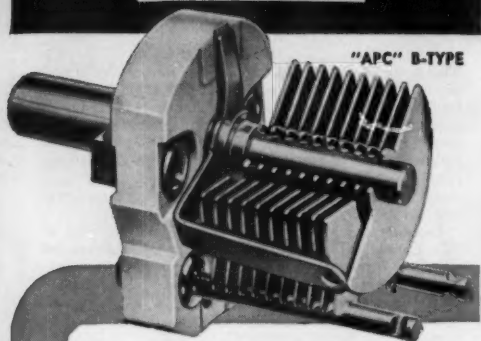
Use the Model AM-1 in conjunction with a signal source for measuring antenna impedance, line matching purposes, adjustment of beam and mobile antennas, and to insure proper impedance match for optimum overall system operation. Will double, also, as a phone monitor or relative field strength indicator.

100 μ a. meter employed. Covers the range from 0 to 600 ohms. Cabinet is only 7" long, 2 $\frac{1}{2}$ " wide, and 3 $\frac{1}{4}$ " deep. An instrument of many uses for the amateur.

HEATH COMPANY

A SUBSIDIARY OF DAYSTROM, INC.
BENTON HARBOR 9, MICHIGAN

AT YOUR DEALERS



APC Capacitors With E-X-T-E-N-D-E-D Shafts

In response to many requests from amateurs, experimenters and electronic equipment builders, Hammarlund is now offering APC - B Type, and MAPC - B Type Capacitors as standard items through Hammarlund Authorized Dealers.

These are extended-shaft versions of the well-known APC and MAPC capacitors. They permit knob-control or shaft coupling.

The original APC trimmer was designed and first produced by Hammarlund more than 20 years ago, and is used in all classes of equipment where a compact high-quality air dielectric trimmer is needed. The MAPC type is similar to the APC except that it is a miniaturized version.

Range of the APC series is from 3 to 140 mmf and for the MAPC, 2.3 to 100 mmf.



For your free copy of the Hammarlund Capacitor Catalog, which gives listings of the complete line of standard capacitors, write to The Hammarlund Manufacturing Co., Inc., 460 West 34th Street, New York 1. Ask for Bulletin C8.

HAMMARLUND

(Continued from page 78)

II and an HRO-50T. IXA put out another FB issue of WIN News. The Polecat Net picnic was held June 12th near Green Lake. RACES facilities were given a good workout during the National Test June 15-16. A preliminary meeting of RACES net operators was held in Wausau May 30th. On May 31st NUW was operated on emergency power from Rib Mt. for 12 hours as NCS on 29,620 kc. dispatching mobile units over a radius of 60 miles to time the State Endurance Motorcycle run. Those participating were VHA, JBF, RQM, OVO, RLB, FCF, QJB, and CFT. Traffic: WOCXY 547, SAA 275, FFC 143, DVM 101, IXA 101, CCO 42, RTP 41, BVG 37, YZA 33, AJU 28, RQM 23, GMY 20, SZR 16, KWJ 10, DIK 8, OVO 5, IJU 4, RKP 3, UIM 3, IAL 2.

DAKOTA DIVISION

NORTH DAKOTA — This report is being made by W0EOZ in the absence of an SCM. PAM: GZD, PHR, Dakota Division Director, has appointed GZD and EOZ as Assistant Directors for the State. The Jamestown Amateur Radio Club is building an 813 rig. NPR reports he will be QRL this summer working and will not be able to keep up NCS on the 'phone net. OEL has a Collins now and expects to put up an all-band skywire soon. EOZ has been QRT rebuilding for TVI, and is back on the air after hanging the skywires that came down in the May winds. YIZ is rebuilding. QJP has gone to Camp Grafton for two weeks with the National Guard. AVT has accepted a position with the CAA at Jamestown, but still commutes to Fargo week ends. The Bismarck gang reports the ham-borne is shaping up well. NOTE — In case a new SCM has not been elected by July, please mail or relay your reports to EOZ before July 6th. Traffic: W0VCQ 84, UVH 67, NPR 11, EOZ 2.

SOUTH DAKOTA — SCM, J. W. Sikorski, W0RRN — Asst. SCMs: Earl Shirley, 0YQR, and Martha Shirley, 0ZWL. SEC: GCP. PAMs: GDE, BNA, NEO, and PRL. RM: SMV. YQR started out as Pennington-Meade County EC with a bang — signing up ten new AREC members. Bob Mitchell, 1SWX, formerly of Ellsworth AFB, has returned from Europe and has been discharged. He can be reached at his home QTH. SMV stuck up a vertical and his first two contacts were KH6 on 7 Mc. and his first VK in 18 years on 14 Mc. KYL is moving to Sioux Falls. After many months, RRN is mobile with Viking and 3BR. OOO engineered the job. Net reports: NJQ, QNI 433, traffic 83; 75-net, average daily QNI 35, average daily traffic 6; C.W. Net, 13 sessions, 87 QNI, traffic 45. Since you will have a new SCM next month, I wish to thank you all for your cooperation during the last five years. Traffic: W0GDE 71, PHR 67, SMV 42, SCT 27, BQH 16, RRN 13, RSP 4, OQZ 2, GWS 1.

MINNESOTA — SCM, Charles M. Bove, W0MXC — Asst. SCM: Vince Smythe, 0GGQ. RMs: KLG and DQL. PAMs: JIE and UCV. TUS has been appointed OPS. The Minnesota Junior Net, MJN, needs members. The Net meets on 3690 kc. on Mon., Wed., and Fri. KJZ and IRD, both members of the YLRL, attended the YLRL Convention at Milwaukee. Lydia was appointed as Tenth Regional Chairman by that body. She also was instrumental in bringing to the Twin Cities the 1956 YLRL Convention to be held next May 25th, 26th, and 27th. UUE has a six-element beam on 20 meters. Yes, six elements. SFU has a new 500-watt rig on the air. 8LEH and his XYL were visitors at GWJ's home. It seems that GWJ and LEH were former members in the same Air Force Fighter unit in communications during World War II. They recently set up a 40-meter schedule to continue old friendships. CO is getting a new Collins KW for s.a.b.a.c. QNY is working on some ARC-5 gear for emergency and mobile. QDP now is ORS. The Stillwater High Radio Club is now officially an ARRL affiliated radio club. Anyone wishing to attend meetings should contact YOC, who lives at 1022 So. 4th St., Stillwater, for information on the time and place. SZJ now has a new Ranger which he assembled. UGV, of Appleton, and RSP, of Marvin N. D., both on 2 meters, held a fine round table with four other stations. 8ZJ was on 75 meters working cross band. ZSJ was surprised to find that 2 meters is so active in the rural communities. IRJ had a nice visit with EYH at camp. Traffic: W0KLG 183, KFN 143, KJZ 139, WDW 131, WMA 101, TUS 95, QDP 78, DQL 74, IRJ 59, RLQ 43, MVJ 40, UCV 40, MBD 38, WVO 38, RVO 36, GTX 32, FCU 27, LST 26, LUX 24, TKX 22, NTV 20, OPA 20, OSJ 14, VOA 14, WAA 13, MXC 12, BUO 7, HAH 6, AFP 5, QNY 5.

DELTA DIVISION

ARKANSAS — SCM, Owen G. Mahaffey, W5FMF — Your SCM lost out on some of the State activities by having the flu for two weeks. The Union County Amateur Radio Club soon will be on the air with a Viking II and an HQ-140X. The Club is conducting code classes each Tue. and also is working on a civil defense set-up. A new ham at El Dorado is AXQ. ECs for the month are ZBX and ZJI. We are all sorry to hear of NDH's illness and hope he has a speedy recovery. Traffic has picked up on both the c.w. and

(Continued on page 80)

**IT'S HERE!
IT'S ALL NEW!
IT'S THE PRO-310!**



A major achievement in amateur receivers!

Hammarlund's answer to the requests of hams for a professional receiver at an amateur's price—that's the NEW Pro-310!

Within the new cabinet which has the design of a custom-built professional rig is the amateur receiver of the future—here TODAY!

Look at these features:

- All frequencies can be read to 1 part in 5000. . . Bandsread is continuously calibrated over the entire range from 550 KC to 35.5 MC, not just over a couple of selected bands as in most ordinary receivers.
- Single Sideband Operation is yours... because exalted BFO and sharp selectivity are built-in.

- Exceptional Stability.
- High Image Rejection... on all 6 bands. Double conversion on the top 4 bands.
- Your choice of colors... black cabinet with gold trim or grey cabinet with silver trim.
- Other completely new design features . . . including rugged turret, modern etched and plated circuits in the RF section; sectionalized construction; and restful wrist-high controls.

* * *

For more information on the new Pro-310, write to The Hammarlund Manufacturing Company, Inc., 460 West 34th Street, New York 1, N. Y. Ask for Bulletin R-8.



HAMMARLUND

SINCE 1910

'phone nets. We hope we can continue to improve and think we can as several members are new at handling traffic. Those having appointments, take note of the expiration dates and mail them in for endorsement, please. Traffic: W5WUN 64, SXM 47, VAA 29, JZL 22, DAG 16, FMF 14, EMN 10, HEE 7, RPB 6, VAN 6, SYQ 4, ZJI 2.

LOUISIANA—SCM, Thomas J. Morgavi, W5FMO—The Mansfield ARC has become affiliated with ARRL. VRO should be on the air soon with his new Globe King. GFA is going a.s.b. APH has a new mobile rig. SWQ, discharged from the AF, now is living at Vinton. BSR, CCD, ZJS, SKW, and TVH, all mobile, furnished communications for the c.d. police in the Armed Forces Day Parade. The Westside ARC's DX Contest was won by INL, with BUK and KOQ second and third. K5FFA makes BPL again with 906 messages handled. YSN is active on RN5 and MARS. HEJ resigned as PAM because of poor health and MAV has taken on the job. The Monroe Hamfest was a huge success with an attendance of about 275. New ECs are TKV and RRO. EYF, new OBS, sends Official Bulletins on Mon., Wed., Fri., and Sun. at 8:00 p.m. CST on 7180 kc. New OPs include FKA, SUM, and UGJ. ZAB is going a.s.b. KC had his beam spinning around like a top during a severe windstorm but it was not damaged. He is ORS and DXCC. The Mayor of Buena Park, KSI, met Virginia (the XYL of T12BX) at the New Orleans Airport en route to San Jose, Costa Rica, to meet her OM. EA is looking for 'phone patch traffic into Alexandria. FKA, active in the Baton Rouge Emergency Net, reports HKZ is building a new transmitter. UGJ has a new mobile in operation. Thanks for the reports. Keep them coming. Glad to have met a lot of the fellows at the Baton Rouge and Monroe hamfests. Traffic: K5FFA 906, W5NG 98, NDV 95, MXQ 92, EA 48, UGJ 10, FKA 2, EYF 1.

MISSISSIPPI—SCM, Julian G. Blakely, W5WZY—SEC: PFC. PAM: JHS. RM: WZ. This has been a season of hamfests and the "eye-ball" contacts made should carry us through until next season. Don't forget the next big 'fest is at Jackson on the last Sunday in August. JHS won an Elmac Rec. at the Mobile Hamfest. The Centreville Amateur Radio Assn. (CARA) has been organized with W5N5GIF, pres.; KN5ALP, vice-pres.; Jimmy Templeton, secy.-treas.; GDW, PIO; KN5BAI, act.; FCB, advisor. YAR has been appointed OBS for N. Miss. Listen for the latest League and FCC information on 3935 kc. at 8 p.m. Mon., Wed., and Fri. DRP has General Class license and is our first OBS appointee. YFJ has increased power with a BC-610. IGW is running a cool 300 watts on the Mississippi Rebel Net as NCS. Traffic: W5VME 260, IGW 177, YFJ 136, JHS 123, YBH 75, EDE 54, EWE 36, KYC 27, RIM 17, WZY 16, OTD 14.

TENNESSEE—SCM, Harry C. Simpson, W4SCF—SEC: RRV. PAM: PFP. RM: WQW. Congratulations to PVD on the certification of his DXCC. He sends a breakdown on Tennessee DXCC members: TM 213, NNH 182, AZD 170P, MKB 167P, AAW 133, QTD 124, AQR 120P, MB 120P, NBV 116, DPE 110, NDE 109P, KKK 102, IIB 101P, GD 101, PVD 100. PL suffered a severe heart attack in mid-May but says he is doing OK. Send him a card, fellows. PFP reports the Mid-Tenn. group has chosen 50.44 Mc. as its 6-meter Net frequency. WQW sends roses to WQT and WOX for their origination of such fine traffic on Armed Forces Day. In turn, they send thanks to those who cooperated with them so nicely. VNE and WQW have been fixing up their shacks. DMU announces that the Davidson County 10-meter Emergency Net meets Sun. and Wed. at 7 CST, 29.6 Mc. He also advises that the Old Hickory Club will send a certificate to any ham working five members. OEZ reports from Nashville that AEE, AY, VFC, and RFR are now on 6 meters; he also says the RACES plan has FCDA approval. The Middle-Tennessee 2-meter Net shows 14 members on its current roster. ZBQ, on 6 meters, worked 1 Minnesota, 2 Texas, and 2 South Dakota stations and heard a CO2. FLW reports that the Tri-County Club operated on Field Day from Paris Landing State Park. The Memphis Club again is sponsoring a ham school at Memphis State College, under the able direction of DCH. WQT reports the Clarksville ARC operated on Field Day from Howard Petus Park. WOX and YRI are being transferred to Italy. SCF visited OIW, PFP, and WQW and has been modifying an RCA KW, courtesy of the 3rd Army. K4FEU is being transferred to KW6-Land. WIJ is leaving Cookeville, headed for DX-Land, too, says UWA, who is going back to Kentucky for the summer. WXL will be in North Carolina for the summer. Traffic: W4PL 813, K4FEU 246, W4OGG 238, WQT 236, WOX 197, WQW 183, PFP 142, PQP 125, IIB 103, SJ 76, YMB 74, IV 57, SCF 53, HIH 48, VJ 31, UWA 20, ZBQ 20, CXY 17, VNE 17, FLW 9, PAH 8, HLR 7, DCH 2, HUT 2, LRO 2, NDC 2, DMU 1, HSX 1, OEZ 1, PVD 1.

GREAT LAKES DIVISION

KENTUCKY—SCM, Robert E. Fields, W4SBI—SEC: CDA. RM: KKW. Acting PAM: NIZ. The Acting PAM reports the following statistics for May: 30 sessions of KPN, 550 total call-ins, 18,333 stations per session, 201 traffic total, 6.7 messages per session. He also reports that traffic is on the increase in spite of the very poor receiving conditions. RM KKW reports for the KYN c.w. nets: 62

sessions, 43 active stations, traffic total 320, 7.4 per session compared to May 1954, with 56 sessions and only 30 active stations. June will have come and gone when you read this, but I am sure you will have enjoyed every minute of it with picnics, hamfests, c.d. test, and last but by far not least, Field Day. OMW has been working some choice DX lately: OE5HE, 4X4FQ, YU3IG, GW3FYR, LA3BD, YU1KK, and I1BLF/T. His DX now totals 85 stations. JSH, chairman for Field Day activities in Lexington, is getting c.d. organized locally. He also is Deputy Communications Director for the 8th mobile support group. ZDB has a walking power mower. We know. We just had a QSO with Moose, ZDA, Doc's XYL, in which she stated that ham radio was much more fun than mowing the lawn. We agree. Traffic: W4KKW 225, K4FAV 112, W4SBI 84, RPF 82, ZDA 69, ZDB 56, QCD 39, HSI 29, BZY 25, KRC 18, JSH 14, BAM 13, SUD 13, WBD 9, IAY 6, JUL 2.

MICHIGAN—SCM, Thomas G. Mitchell, W8RAE—Asst. SCMs: Joe Beljan, RSOW (c.w.); Bob Cooper, 8AQA, ('phone). SEC: GJH. It is a real pleasure this month to thank all contributors for the news items received. Keep them rolling in. The one new appointment this month went to WVP as OES. Cliff, formerly 9IOC of South Bend, now is residing in Shepherd. DAP is building a new receiver and expects much from it. WVJ visited 3MIE after seven years of QSOs and QSPs. EX currently is rebuilding a Traffic Master. Ex-SCM HKT, the country squire, is "frosted" over his frosted strawberries. HSG is justly proud (and so are we) of his revised ham license plate bill which passed both branches of the Legislature without a single dissenting vote. Cos still is pitching for us and getting the support of his colleagues. PHA is QRX for summer duty at Ft. Campbell, Ky. FSZ reports that SCW admits possession of a microphone, TJJ and RXY have towers back up after a wind storm, and Skutt is QRL painting and fishing. New officers of the Motor City Radio Club are YDR, pres.; PJD, vice-pres.; SKJ, secy.; NBF, treas.; and FWW, custodian. TBP and the Muskegon group still are plugging c.d. work on 29.06 Mc. The Niles Club members are working on common 144 Mc. portable-mobile transmitters and receivers as a club project. These are planned for use in RACES work. UKV introduces XYL UFZ, who used to be 3RTZ. QKK says that his voice threat is over and he expects to station in Searinaw. MGQ has new 8005 modulator and 4E27s working on 75 meters. FGB is wrapped up in 160-meter DXing. He has worked G, VP7, YV5, KP4, and has a heard report from ZL3! For the rest of us, TIC sums it up pretty well by saying that this warm weather is fine for outdoor work. Traffic: (May) W8NOH 283, PHA 242, NUL 234, ILP 133, FX 119, ZLK 85, SWG 84, DAP 69, SJF 61, SCW 58, IJ 56, QIX 30, QQQ 28, TBP 28, RAE 23, NTC 21, WVL 21, HSG 13, COW 11, DLZ 11, AUD 8, TDP 8, HKT 6, PHM 6, WOX 6, INF 5, FSZ 4, MGQ 4, PDF 3. (Apr.) W8IKX 45, SIB 34, OQH 21, TBP 16, TQP 10, QKK 8, OT 4. (Mar.) W8TQP 15.

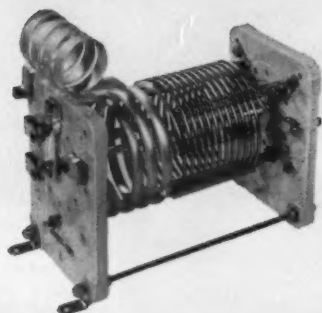
OHIO—SCM, John E. Slinger, W8AJW—Asst. SCMs: J. C. Erickson, 8DAE; W. B. Davis, 8JNF; and O. V. Bonnet, 80VG. SEC: UPB. RMs: DAE and FYO. PAMs: EQN and HUX. New appointments made during May were ZCV as OES and 5BRM/S as EC. The Wright-Patterson AFB Club used KP as its Field Day call. The Club station call is K8FAD. MGC has installed a V-37 vertical. PBX won first prize at the Madison, Ind., Hamfest. On May 1st the Findlay group had a timed emergency run, (13 minutes for 5 miles), which they feel is mighty good. New Findlay Club officers are QP, pres.; UN, vice-pres.; and QKO, secy. JDN has joined MARS. GDC has installed an emergency-power unit. The Medina Co. Club now meets at the Lodi State Bank Bldg. the last Tue. of each month. WE's XYL has made WAS. BAI is a new Novice in College Hill. Ohio has been well represented in 8RN sessions, according to DSX/SG, net manager, with NVJ, a relative newcomer, carrying much of the load. We have learned that FYO's mother has been seriously ill. We wish her a speedy recovery. WNSVLL, MBE, and MNR finished one-two-three in the Toledo mobile hidden transmitter hunt of May 15th. New Van Wert Club officers are DHG, pres.; ASL, vice-pres.; OWC, secy.; AGL, treas.; and PIZ, act. mgr. On May 14/15 the Toledo amateurs had an amateur station set up at the Explorer Scouts Exposition. New Toledo Radio Club officers are BIQ, pres.; BN, vice-pres.; RZQ, rec. secy.; RBX, corr. secy.; and RZM, treas. The CACARC has abandoned the summer picnic but is lining up a technical session for early fall and also planning a county-wide QSO party. We congratulate the Cincy Mike & Key for publishing the Radio Amateur's Code. This should appear more frequently in more publications! OVARA's *Ether Waves* states that BQT, BRA, CGY, EV, GY, KBJ, and WBY all were transferred to Cincinnati as a result of A.T. & T. relocating its central office. The Dayton R. F. Carrier informs us that the Hobby Show of May 12/13 came off with a "bang," the DARA Field Day committee established awards for high-scoring groups and outstanding operators during the Field Day activities; and FPZ has been made director of the W3/8 call areas for the TCPN. The Early Bird Transcontinental Net (3845 kc.) roster includes Ohioans AMH, FJV, GDB, FPZ, and K8FCJ. Springfield's Q5 mentions that IKB, HBJ, HOL, and HTE will be featured monthly speakers during monthly meetings, starting with

(Continued on page 84)

QUALITY PRODUCTS

BY

B&W



1 KW PI-NETWORK TANK COIL

A high-power integral bandswitched pi-network tank coil for maximum efficiency operation from 80 through 10 meters. For Class "C" or linear operation using triodes or tetrodes in conventional or grounded grid circuits. Positive-acting, high current, r-f switch selects operating band. Stepped sectional coil windings of Model 850, with extra heavy conductor at the higher frequencies, provide ample current carrying capacity, minimum "Q" of 300 over operating range.

SINGLE SIDEBAND GENERATOR



The 51SB generator offers sparkling SSB performance with your present B&W, Collins, or Johnson transmitter, on 80 through 10 meters with the output frequency control presently in your transmitter.

ALL OF THESE FINE B&W products are available at leading distributors' everywhere.

AUDIO PHASE SHIFT NETWORK



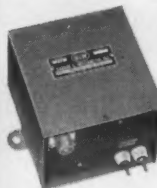
Model 2Q4 splits any audio signal from 300 to 3000 cps into two equal amplitude components $90^\circ \pm 1.5^\circ$ out of phase with respect to each other . . . for SSB operation.

COAXIAL SWITCHES



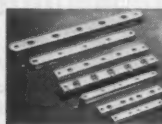
Model 550 permits instant selection of any one of five 52 or 75 ohm lines. Model 551 is a 2-pole, 2-position type used for switching various devices in or out of series connection with coax lines.

1 KW BALUNS



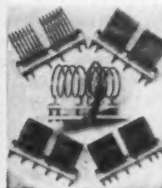
Fill the gap between unbalanced feed lines and balanced antenna loads, provide maximum transfer; low power line radiation on transmission; high signal-to-noise ratio on reception. Models for rotary beam, folded dipole antennas.

CERAMIC PLUG AND JACK BARS



Carefully made steatite materials provide experimenter with same units used on B&W inductors. Strength and rigidity also make them useful as spreaders for feeders and other parts of the antenna system.

TYPE TVH INDUCTORS



Eight-plug jack bar of these inductors provides greater efficiency on all amateur bands, 160 through 10 meters, as well as greater flexibility of operation.

Barker & Williamson, Inc.

237 Fairfield Ave., Upper Darby, Pa.

Quality, Style and Beauty



THE *ALL NEW* COMMUNICATIONS RECEIVER

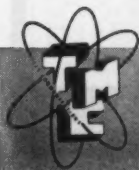
TE GPR
90

THE TECHNICAL MATERIEL CORPORATION, and TMC CANADA, LIMITED, have for many years been engaged in the manufacture and sale of high quality precision communications equipment such as, high stability direct reading oscillators, radio teletype frequency shifters and converters, broadband transformers, tone telegraph systems and diversity and fixed tuned receivers. Millions of dollars worth of this equipment is in use in twenty or more countries throughout the world. Three of our receivers, the DDR, the DRP and the FFR are now in regular use by the United States and Canadian Air Forces and Navies, so we felt we could produce a really good communications receiver containing many of the high priced requirements of the military and yet keep medium price range for the amateur.

In our work, both consulting and manufacturing, we have tested practically every receiver in the field and have included every basic feature inherent in a good unit but have added some new ones of our own. Compare our features to any receiver in any price range. Bulletin 179B for complete details.

Complete receiver - Amateur Net **\$395⁰⁰**

Matching Speaker **\$16.00 extra**



THE TECHNICAL MATERIEL CORPORATION

MAMARONECK, NEW YORK.

OTTAWA, ONT., CANADA

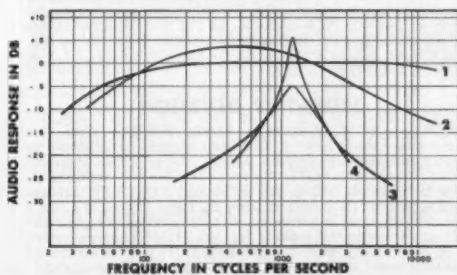
mark the birth of

FEATURING:

- Six bands covering .54 to 31 Mc. - AM, CW, MCW, and FS with appropriate FS converter.
- Accurately calibrated main tuning dial plus auxiliary dial with full Electrical bandspread.
- A ferrite transformer provides accurate antenna matching for 75 ohm unbal. and/or 300 ohm balanced inputs.
- Sensitivity: 1 (one) microvolt or better for 10-1 signal to noise power ratio, 1.5 to 31 Mc. Less than 5 microvolts for .54 to 1.5 Mc.
- Image Ratio: Better than 60 db.
- Selectivity: Variable in 6 steps from 200 cy to 5 KC, 5 crystal and one non-crystal positions.
- Input: 105-125VAC 50/60 cy., approx. 90 Watts -
- Output: 4, 8, 16, 600 ohms, 2 Watts high quality audio-better than 60 db hum level.
- Highly effective noise limiter - Calibrated "S" Meter - Dial locks.
- Specially designed Audio Selectivity control with variable bandwidth.
- Diversity operation is available with the GPR-D. Provisions for external control for HFO, BFO, IFO.
- SSB Coaxial IF output & Audio input.
- Cabinet or rack mounting . . . 52 lbs. . . 20"w. x 10"h. x 15"d. (Cabinet.)

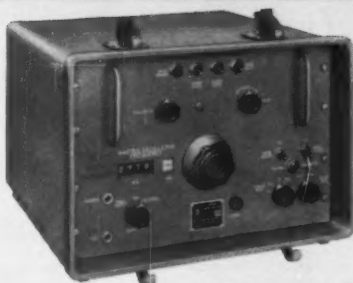
TUBE COMPLEMENT:

6AB4 Grounded grid input RF amp.	3-6BA6 IF Amplifiers
6CB6 2nd RF	6AL5 Det./Noise Itr.
6AU6 1st converter	6AG5 BFO
6AG5 Oscillator	12AX7 Avc and Audio Amp.
6BE6 2nd Converter and Oscil.	6V6 Output
6BA6 IF Buffer Amp.	OA2 Regulator
	5U4G Rectifier



AUDIO SELECTIVITY

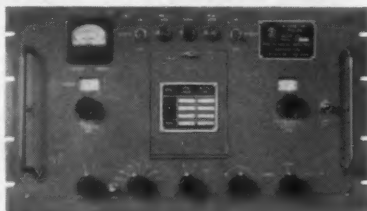
Position #1 Normal. Position #2 Communications. Position #3 high selectivity with broad and sharp (#4), variable control of a sharp toroid filter centered around 1200 cycles. As much as 850 cycle separation has been achieved with complete ease with this newest of receiving features.



MASTER OSCILLATOR
AND FREQUENCY METER

MODEL PMO

An oven controlled high stability portable master oscillator - readable and resettable to better than 20 parts/million. The PMO is being used as frequency meter and transmitter exciters, 2 to 8 mc. Direct reading in cycles on basic range 2 to 4 mc. Write for bulletin 173A.



FREQUENCY SHIFT EXCITER

MODEL XFK

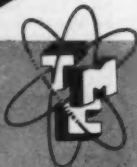
Highly stable—Shift Variable from 0 to 1000 cycles. All controls calibrated in frequency. Keying speed 1000 WPM - 1.0 to 6.9 mc in 2 bands. Write for bulletin 118.

Your emblem of quality, craftsmanship, and guarantee of performance. Look for it at your favorite dealer or write . . .

THE TECHNICAL MATERIEL CORPORATION

MAMARONECK, NEW YORK.

OTTAWA, ONT., CANADA



(Continued from page 80)

June. The Columbus *Carascope* relates that EA is on 40-meter c.w. with 25 watts; HUE has a new 50-foot tower; ZCK has a new 20-meter antenna; and DWG is a senior in physics at Ohio State. Toledo's *Shack Gossip* lets it be known that HCN and QCT are now mobile; VPZ has a new jr. operator; WMO and WTW are new Toledo Novices; and the Toledo U. Radio Club has a home-built 500-watt transmitter on the air. Eastern Ohio's *Ham Flashes* reports that KYL, of Cortland, is the first RTTY station active in the area; NXK was elected president of the Salem Lions Club; 6MPQ has moved to Youngstown; TDD, of Alliance, passed his General Class exam.; DXO has changed QTH; and new Novices in Warren are WHV, WAF, and WRP. FRY, editor of *Ham Flashes*, recently had a paralytic attack. Speedy recovery. Don! Traffic: W8NVJ 288, IIR 236, ARO 180, UPB 174, DAE 153, RO 112, AL 61, HNP 59, FJV 51, HPP 41, AJW 39, AMH 36, JHH 30, HUX 28, QXH 25, EQN 24, JH 24, ZAU 23, LYD 14, OXP 12, AJH 11, PFX 11, GZ 10, LMB 10, TLW 10, HFE 9, NZC 9, KUD 8, RN 8, PJ 7, APF 6, AQ 6, ET 6, MGC 6, LGR 5, VUS 5, BLS 4, DG 4, IAY 4, KIH 4, WYL 4, THJ 3. (Apr.) W8NZC 7.

HUDSON DIVISION

EASTERN NEW YORK — SCM, Stephen J. Neason, W2LLI — SEC: RTE. RMs: K2BJS and TYC. PAMs: GDD and JLG. The Ladies' Auxiliary of the AARA is to be congratulated on a job well done in sponsoring a recent dinner party held at the Shadow Box near Albany. The affair was well attended and many guests, including your SCM, were present. The Club soon will celebrate its 45th anniversary. Congrats to K2BJS, who earned a BPL medalion plus a Public Service Award. The HHRL will stop publication of *Zerobeat* for the summer. K2EIU will attend R.P.I. in the fall. Congrats to TEP, manager of NYSEPN, and those responsible for the publication of *Zerobeat*, the new net bulletin. Look for this net on 3920 kc. Mon. through Sun. at 1800. From all indications and reports, our Eastern New York clubs have enjoyed a very successful season. The coming season looks even more promising, since many are planning more activity and social events. Yes, there is a club located near your home. A card or message to the SCM will bring information. K2CQS finally has gotten his s.a.b. signal on the air. AWQ is getting out FB on 144 Mc.; the rig is a Gonset. K2HXR dropped the "N." Our best wishes for a safe and enjoyable trip go to our busy SEC, RTE. Ted will visit France and Germany while on a trip lasting several weeks. All AREC matters will be handled by Assistant SEC LEL during Ted's absence. The Eastern New York Council of Radio Clubs extends a cordial invitation to ALL of the Eastern New York clubs to take part in our council activities. For full information, please contact EFU, secy. TYC still is on 7 Mc. but claims conditions unfit for QTC work. Don't forget your endorsement date. Traffic: K2BJS 82, EHI 76, EDH 31, BE 22, EKE 17, W2EFU 15.

NEW YORK CITY AND LONG ISLAND — SCM, Carleton L. Coleman, W2YBT — Aast. SCM: Harry J. Dannals, 2TUK. SEC: ADO. PAM: NJL. RMs: VNJ and LPJ. ZAI has found it necessary to resign as SEC and ADO has taken over this important post. Thanks to Jim for his fine work and let's all cooperate with Mike in his new position as SEC. All ECs report to M. Mulligan, W2ADO, Box 134, Westbury. VNJ reports that the NLI Net is now on summer schedule (Mon. Wed. and Fri., 3630 kc. at 1930 EDT). KGN resigned as EC for Brooklyn and K2CRH took over. HDV has taken over as Radio Officer for Brooklyn. K2GMC is EC for Manhattan and OQI is EC for Brookhaven. K2HYK had his best traffic total to date. New appointments: WFL as ORS K2s EQH and IDO as OBSs. All ORS, OPSs, and stations handling traffic are urged to report traffic totals regularly. KN2LGR is on 80 meters with 807 and ARC-5 receiver. ELK installed 2-meter mobile rig in his new car after a battle with 12-volt conversion. The Eastern Suffolk RC now has over 50 members and is still growing. New officers of the NYU RC are K2EOF, pres.; GHH, vice-pres.; KN2JHM (M), secy.-treas.; and FSO, trustee. The Order of Boiled Owls RC placed 9th in the country in the SS Contest and 2nd on a points-per-man basis. K2AMP is building an electronic keyer. AEE discontinued major station activities for the summer. VDT built a secondary frequency standard. PF would like to see an s.a.b. traffic net. Anyone else interested? IN has a new 30-foot telescopic mast for 2-meter antennas at Brewster QTH. We regret to report that CZV has joined Silent Keys. LGK's jr. operator is now KN2OFO. K2KXZ dropped the "N." Ditto for K2IAD, who plans to use a BW5100 with his HG-140X. K2HSZ is going on 2 meters. K2KNA has a new Viking Adventurer. The NYU RC station, DSC, has a new BW5100. New officers at Columbia U. RC are KN2IKI, pres.; OLA, vice-pres.; KN2LQN, secy.; K2DUV, treas.; DAI, tech. dir.; and K2CUI, comm. mgr. K2AAM started a 50-Mc. mobile rig. K2BAH has a new beam for 144 Mc. New officers of the NYRC are CMM, pres.; UWG, vice-pres.; ATT, secy.; and OGX, treas. YBT is back on the air with 100 watts. New officers of the Fordham RC are K2CQW, pres.; RRR, vice-pres.; IGS, treas.; HVC, corr. secy.; and K2CON, rec. secy. Club directors are IVG, IN, ZYC, IGS, and K2s BRK and CQY. The Club now boasts

of more than 100 members. K2HID soon will be in W-Land. BTA is on 220 Mc. with a QST-brewed rig using 6360 final. DLO has crystal converters for 6, 2, and 1 1/4 meters. K2IDO expects to start handling traffic soon. K2CQP/2 can be heard from summer camp at Andes, N. Y. New officers of the Nassau RC are MDM, pres.; VL, vice-pres.; K2GQA, secy.; K2HEA, treas.; and PC, GLU, and K2BMD, trustees. ONG keeps skeds with his son, HUW, in Plattsburg, N. Y. Keep the reports coming during the summer! Your reports are needed prior to the fifth of each month in order to meet the schedule. Traffic: (May) W2VJN 256, K2HYK 207, W2OME 108, K2ABW 87, W2GXC 75, MUM 72, WFL 68, K2AMP 67, W2AEE 60, VDT 33, PF 23, K2CRH 20, W2IN 19, LGK 18, OBU 17, K2HID 15, W2TUK 13, K2KXZ 6, W2MDM 5, EC 3, IVS 3. (Apr.) W2AEE 426, JGV 95, K2HID 45.

NORTHERN NEW JERSEY — SCM, Lloyd H. Manamon, W2VQR — SEC: IIN. PAM: CCS. RMs: NKI, CGG, and EAS. DXD is off on a round-the-world business trip and will be away from the home QTH for about three months. K2BWQ has new Collins KWS-1 and 75A-4. K2EQD is back from a Naval Reserve cruise to Florida. Network activities in NJN are slowing down a bit because of summer activities. JKH is off the air until the fall season rolls around. K2HXP has built a new rig and would like to get in touch with W2HXP. If W2HXP could arrange a sked it would be appreciated. KN2KHZ is burning up the air these days. So far he has worked 31 states. K2CHI is active in RACES nets. CVW is QRT for a few weeks because of a moving job which has to be done. K2GAS received a G. E. certificate for participation in emergency traffic nets during the past hurricane season. K2IKS is going mobile. John has just been discharged from the Army and plans to attend school in Potsdam, N. Y., in the fall. NYI still is QRL work. K2IBC was on with nine half-hour code practice transmissions last month. The Windblowers V. H. F. Society has a new banner designed by ISK's XYI. KN2MPE is a new station in the Livingston Area. NIE is the new Civil Defense Comm. Officer for Interlaken. At this writing all hands are hard at work preparing for "Operation Alert 1955." From all indications RACES activities in the section will reach a new high during the period of the test. State Civil Defense authorities are counting very heavily on amateur radio to carry the bulk of traffic which will flow from the bombed-out areas where land lines have been destroyed. New Jersey State RACES networks have accepted the challenge and are ready to take over. Our thanks go to the County ROs who have made the program possible. A late news flash has brought the good news that the new amateur license plate bill has just passed both branches of the State Legislature and is before the Governor for signature. NUI has done a fine job in following this project to the bitter end. There have been many adverses along the road but he has stayed with it. He has appointed a new committee to meet with the Director of Motor Vehicles to pave the way for the Governor's signature to the bill. The new committee is composed of ZI, HX, and your SCM. We hope by the time you read this column the bill will have been signed into law. The State Director of Civil Defense and Disaster Control has promised to lend a hand in putting the importance of this bill before the Governor. K2ICE has a new horizontal array on 144 Mc. NIE is mobile on 144 Mc. from his yacht, the *Jane K*. Traffic: W2EAS 216, K2GFX 75, BWQ 58, W2CCS 42, K2DSW 29, W2FPM 19, K2IKS 17, HLA 8, W2NIY 3, CFB 2, CUX 2.

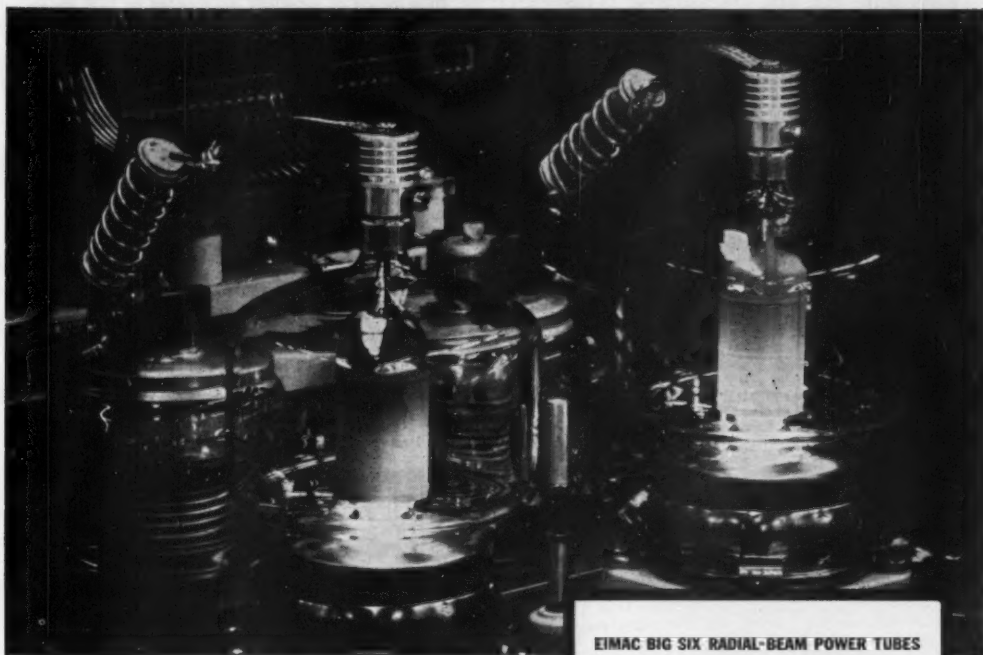
MIDWEST DIVISION

IOWA — SCM, William G. Davis, W6PP — Well, this is my swan song, fellows. It's been a great satisfaction to serve you these many years. Please give your full cooperation to your new SCM. He can't do his job without it. New WNs in Humboldt are ZPM and ABE. LJW reports the Davenport Club was in there on Field Day. CGY has a new NC-125 and is active on TLCN. DST is scraping the bottom of the barrel looking for DX. HMM has an active class. SCA finally made the 'phone net. He reports his lowest monthly score in 18 months was 1117. QVA reports that NWX (F08AJ of Clipperton fame) gave a talk to the Clinton Club. BDR addressed the Waterloo Club. KVJ had to curtail his TLCN activity on account of his work. QVA converted his Ranger for grid-block keying and likes it very much. SCA fixed his new Ranger likewise. TLCN members at the Quad City Hamfest were BLH, FDL, HMM, LJW, PKT, and QVA. Two new hams in Burlington are Novice BKL and Technician ASX. SEF again is active on the net. Well, that's it, fellows. Thanks for all the notes. I shall miss the job but I'll never forget the experience and the fine bunch of fellows I've worked with. So long and 73. Traffic: W6BDR 1530, SCA 1271, PZO 710, CZ 321, QVA 124, LJW 113, SQE 97, BLH 48, LGG 35, KVJ 33, NGS 18, PAN 14, PKT 13, SEF 9.

KANSAS — SCM, Earl N. Johnston, W0ICV — SEC: PAH. PAM: FNS. RM: KXL/NYI. The SCM's new address is 1100 Crest Drive, Topeka, Kansas. The Udall tornado disaster is top news this month. REP, of Mulvane, found out from Mulvane Police at 2350 May 25th that the town had been leveled. He fired up his fixed station with his XYL ZTH at the mike and took out for Udall in his mobile

(Continued on page 86)

How to select a tube for single sideband



To realize the advantages of Single Sideband operation, there are two important points to keep in mind when selecting a final amplifier tube. First, since there is no continuously running carrier, high peak powers may be reached when a signal is put on the air. And second, because it is easier to produce an SSB signal at a low power level, it takes more than an ordinary tube to build this valuable low power signal from the modulator to high power in a single amplifier stage. Eimac tubes offer these extras. Their reserve supply of filament emission, lack of internal insulators and widely recognized ability to handle high peak power has been proved over the years. And high power gain is inherent in all Eimac multi-grid tubes. When planning or building an SSB rig, remember these two important points and consider the Big Six of Amateur Radio—Eimac 4-65A, 4-125A, 4-250A, 4-400A and 4X250B radial-beam power tetrodes and the 4E27A radial-beam power pentode.

EIMAC BIG SIX RADIAL-BEAM POWER TUBES CLASS AB₁ LINEAR AMPLIFIER SERVICE

Typical Two Tone Performance*

	DC Plate Voltage	DC Screen Voltage	Peak Sig RF Grid Driving Voltage	Peak Sig Plate Power Input
4-65A	2000	450	100	160
4-125A	2500	555	100	300
4-250A	3000	600	110	630
4-400A	3500	750	135	980
4X250B	2000	350	50	500
4E27A	2500	600	110	325

*Permitting safe adjustment and conservative operation.

You can be sure of Eimac quality by asking your distributor for Eimac—the mark of excellence in electron-power tubes for over 20 years.

For further information about Eimac tubes and applications write our Amateur Service Bureau.

Eimac

EITEL-McCULLOUGH, INC.

SAN BRUNO • CALIFORNIA

The World's Largest Manufacturer of Transmitting Tubes

arriving at 0025 the 26th. ZTH called SIG on the land line and SIG and YMC took off for Udall. At 0045 BAH called in and at 0220 UUS arrived at Udall with his mobile. Then the portable rig was set up at 0600 under the call of ULR/9. Participating thus far were BIX, ULR, UUS, ZMY, MAR, BIX, CIK, IAL, and BVQ. At 0900 OZN took over the NCS and SOE the Wichita Red Cross station and emergency traffic was handled throughout the day. Hats off to those who did such a wonderful job. PAH, our SEC, reports that YUQ/M and he used their mobiles to keep Manhattan posted on the tornado activity May 27th from 2130 to 0030. PAH was on Blumont Hill and YUQ at Police Hq. UAR, KPE/9, and NFX assisted. Christy's picnic and the CKRC picnic were well attended. Traffic: (May) W0BLI 472, NIY 321, REP 269, MXG 210, OHJ 187, UAT 115, FNS 101, SQX 86, ABJ 60, WWR 59, RKO 55, EOT 37, FDJ 32, NFX 31, SVE 27, BET 24, YFE 21, SAF 19, KAJ 18, ICV 15, LOW 12, UAU 12, IFR 11, CET 6, KSY 6, KXB 6, PAH 6, YVM 6, QGG 4, RXM 3, YJU 3, KNADV 2. (Apr.) W0HJ 382, KFS, 9, KN6AHW 3.

MISSOURI — SCM, James W. Hoover, W0GEP — SEC: VRF, PAM: BVL, RMA: OUD and QXO. OGM has a new 750-watt final. VRF reported that RVG, the Kansas City Red Cross station, handled tornado traffic from Kansas and Oklahoma. The Northwest St. Louis Radio Club received a station call, K0AXU. An emergency drill was held in Kansas City on May 29th and was very successful. GAR's line noise let up during May, and his traffic total is back up. The Suburban Radio Club held its annual dinner-dance. The Club is 100 per cent ARRL again this year. VWZ is a new member of MON. QXO travelled 4500 miles on his vacation. YQJ visited OUD and DE in Joplin. SUV helped CPI raise his 75-meter antenna another ten feet. YHL has a new mobile. SPH has installed a 95-amp. generator in his car for mobile work. New officers of the Bandhoppers Radio Club are LTT, pres.; JNK, vice-pres.; EXN, secy.-treas. MON will continue the morning and evening schedule for the summer. Traffic: (May) W0CPI 1313, GAR 548, GBJ 366, OMM 244, VTF 194, RTW 93, CKQ 92, SAK 77, VPQ 51, IIR 45, QXO 32, BVL 25, KIR 17, EBE 16, GEP 14, MRQ 9, HJO 8, YVZ 8, MFB 6, TCF 5, ECE 3, BUL 2. (Apr.) K0FCT 202, W0VPQ 47 K45, ECE 49.

NEBRASKA — SCM, Floyd B. Campbell, W0CBH — Asst. SCM: Tom Boydston, #VYX. SEC: JDJ. The Union Pacific Amateur Radio Club has been organized at North Platte. NET is chairman, KWQ vice-chairman, CBH secretary. KN6AKW was incorrectly reported recently as having a Globe Scout. He is using a Heathkit AT-1 and an 8-40-A. It should have been KN0AKV instead of KN0ARV. Two new calls at Scottsbluff are KN0BBC and KN0BBD. A new call at Mitchell is KN0BJT. RHL has been processed for overseas duty, with Greenland as the intended assignment. DQN is working very hard on the 2-meter rig. GDZ is mobile. W0WVKQ and W0WVKE are on 2 meters. A code and theory session is held on 2 meters every Tue. at 7:00 p.m. CST. A 30-minute discussion is held on theory. Code is sent tone-modulated and lasts almost an hour. The following are ECs: MTL, VQR, UZF, UOB, DQN, GDZ, RYG, LRK, and URC. We are very much in need of ECs in the eastern part of the State. LRK is working on something for more selectivity on mobile converter. A new call at Orchard is KN0AMY. UOB and his XYL stopped in for a very nice chat and informed us that a TVI committee has been formed in Sidney. UOB is the chairman. KQX and GDZ can be heard operating from Estes Park for the summer. The North Platte Club meets the 1st and 3rd Tue. at the Fire Station. Traffic: (May) W0ZJF 310, DDT 153, AEM 48, ORW 47, MAO 29, KVM 26, NIK 22, FR5 21, HTA 14, K0WBF 13, W0PUT 12, VGH 12, ERM 11, SBZ 9, PPT 8, FMW 7, LEF 7, BEA 5, QOU 5, UJI 5, BTG 4, CIH 4, DJU 4, DQN 4, KFY 4, ZNI 4, K0AFO 3, W0CBH 3, THX 3, DDP 2, KLB 2, NGZ 2, OCU 2. (Apr.) W0DQN 12.

NEW ENGLAND DIVISION

CONNECTICUT — SCM, Milton E. Chaffee, W1EFW — SEC: LKF, PAM: LWW, RM: KYQ. MCN and CN 3640 (0645 and 1845), CPN 3880 (1830), CTN 3640 (Sun. 0900), and CEN 29,580 kc. Traffic for CN reached 192, averaging 7.3 messages and 9 stations per session. MCN traffic hit 97, with 3.89 and 7.08 as the same type averages. QNI leaders were CN, RGB, LIG, ZDX, and YNC; MCN: IBE, RGB, and RFJ. MCN discontinued the Sat. schedule because of lack of traffic and interest. We seem to have hit new '55 lows for traffic all around. New General Class licenses are reported by CLD and CKA in Bristol. ODW reports RACES activity from DUL plus his own DX, which totals 161 worked and 135 confirmed. The Redding Radio Club meets the 4th Tue. and seeks ARRL affiliation. Real response to your SCM's plea for EC nominations came from the Middlesex RA to cover that area. Meriden has added several Gonsets to the mobile c.d. fleet to divide the group between 10 and 2 meters. FYG reports the club was active on Field Day from West Peak. RGB reports for the TIJ gang, which holds regular c.d. drills and has the following active: YFG, UQV, IWY, ZYJ, QMB, EBO, LF, DIT, and IJD. The TIJ crew includes RGB, STT, WHR, and PHP. ZZK is racking up DX using a Viking II on 20 meters, the

same for ZTQ with less power. VVB is using 40 meters only these days. A new Stratford Novice is FFX. The Stratford Club meets Wed. and welcomes visitors. OO reports came in from GLX, VVB, and RFC. Traffic honors again go to YBH who gets 'em all on the 'phone nets. More news from the clubs would be especially appreciated so how about loading me with stuff, fellows? Passage of the license plate bill made a lot of the gang happy but we wonder what it will do for the police — one more combination for them to figure out. Anyway, don't try to get them before 1956 renewal time. Traffic: WIYBH 245, RGB 180, LIG 112, KYQ 102, CUH 84, AYC 76, AW 75, EFW 75, UED/1 52, YYM 49, ZDX 28, YNC 26, LV 25, KV 20, BDI 18, TIJ 16, HYF 11, DXI 6, VVB 5, GLX 5, GVJ 5.

MAINE — SCM, Allan D. Duntley, W1BPI/VYA — The Pine Tree Net meets 5 nights a week on 3596 kc. at 7 p.m. The Barn Yard Net meets Mon. through Sat. at 0800-0930 on 3960 kc. The Maine 'Phone Net meets Mon. through Sat. 1700-1800 on 3940 kc. The Teen Age Forest Net meets Sat. and Sun. 1000-1100 on 3900 kc. As this is my first report as SCM, I wish to thank all who supported me. I will pledge myself to carry on the work of the fine gentlemen who have held the position before me. Your continued support of the League is solicited. EFR, of Portland, has been appointed RM. I am sure that under Earle the Pine Tree Net will continue to do its usual good work to serve the people of Maine. Congratulations to the UAQs on a new pink harmonic. WRZ is on the air with a new mobile rig. TWR is forsaking his YLs on 75 meters to work new and greener fields on 20 and 15 meters. NXX now has to share his rig with the XYL, who is WN1FNJ. Look for these new WNs: FKJ, Maynard Bray; his XYL, Shirley, FKK; FHG, Ed Tarbox. DEA is now in the Air Force and looking for contacts back home. Let's not forget Stevie's (BOK) Hamfest Aug. 14th at Dexter. DEG now is K4CYC and is keeping daily skeds with LHA. AZQ has changed jobs and is missed on the Barn Yard Net. YGO and YGP are heard operating portable 3 in Hartley, Md. Traffic: W1WGT 180, TVB 70, NXX 54, ZME 32, UDD 40, LKP 36, LYR 22, EFR 19, SDW 14, TGW 8, BAD 7, YVN 7, BDP 6, BBS 3, TKE 3.

EASTERN MASSACHUSETTS — SCM, Frank L. Bokoim, Jr., W1ALP. Appointments endorsed: JNY, MKW, LQO, VHH, and BGW as OEs; ISU, Holbrook, PJ Everett, SS Lincoln, LQO Hamilton, VYI Topsfield, CLF Norfolk, HGG Malden, MFI Barnstable, TIJW Falmouth as ECs; LQO as OBS; LQO and GDQ as OFS; MEG as OES; WU as ORS. Sorry to have to announce the death of LET of Everett. PYZ, RCA, EHY, FCJ and LJN are on 2 meters. EHZ is new in Lynn. Heard on 75 meters: GYZ, LBH, and LQ. SKIH visited hams in this section. FIR, Medway, and FNM, Quincy, are new Novices. REG is Radio Officer for Mass. Area 2 and AYN for 2B. MON moved to Derry, N. H. Area 1 Radio Comm. held a meeting with KTG, AR, CQ, DWY, ZYX, AWA, ALP, TQP, and QQL present. The Middlesex Radio Club code class has turned out the following new Novices: EZU, FAV, FQB, FGS, FTY, FIO, FIM, FIL (a YL), FJF, FJE, FMW, FOG, FOC, FOL, FRY, FFT, FFF, and ETB. JNV has 163 countries and is working on a new beam. Radio Amateur Open House held a meeting and TON spoke on the benefits of ARRL affiliation. CTR writes Division news for the National Union magazine, *The RR Telegrapher*. The South Shore Club had a talk by MME and an auction with AKY. YLV reports that the gang at the AFRC mostly 2 meters are PYL, QBT, JOI, JBU, IRF, AME, YLV, and RFB. ABJ has 20-meter two-element, cubical quad and raised ground plane. BGW still is RTTY. EPE is NCS of IRN on Tue. UKO has a new SX-96. IBE has a new antenna for 80 meters. DFY now has General Class. QLT has a Viking Adventurer. The T-9 Radio Club elected WNK, pres.; MVQ, vice-pres.; KON, secy.; CVM, treas. TJP is a new member. EK has a 500-watt power plant. VYS is on 6 meters. QMU is building a 10-meter converter. SXD is working on a crystal converter for 2 and 6 meters. PIW is trying stacked dipoles on 10 meters. HOL has a 6-meter Gonset. UH is on 20 meters with a new beam. LMU visited W8-Land. The Bedford Radio Club had an exhibit of amateur radio two-way communications at the annual Lions Club carnival. WKM has two Gonset 2-meter rigs. AEC has a new 10-meter ground plane, also one for 20, 40, and 80 meters; with a rhombic in mind on the 3 1/2-acre club grounds. New Novices in New Bedford are FJI and FJQ. VRK had 35-kw. on all bands. JLN has a Viking Ranger and Maritime Mobile certificate No. 108. MTG is running kw. to grounded grid 304-TH. MGP is working the world on 15 meters with 25 watts. OGK has a new Telerex 20-meter beam and a coax ground plane. NLU has a new Viking KW, EQP and FAO are rather-and-son Novices in Marblehead, also ELA and ELB. The North Shore Amateur Radio Assn. for C. D. has a new TBS for the club station. JEL has a new kw. bandswitching rig. CMM, JEL, TRE, MTG, and MGP met KZ5GD and KZ5DG at JLN's QTH. SHV is Radio Comm. Officer for Lynn C. D. AXA used a helium-filled balloon for a sky hook in the DX Contest. JLN is operating from his New Hampshire summer QTH as FOE. The Winthrop drill had 22 stations on with DLY, EAJ, DQF, BDU, CMW, DEL, DJ, OIR, DPN, DRP, DUV, HFJ, MQB, NMX, TTH, BOX, UOC, VIB.

(Continued on page 88)

NO MORE SPACE PROBLEMS

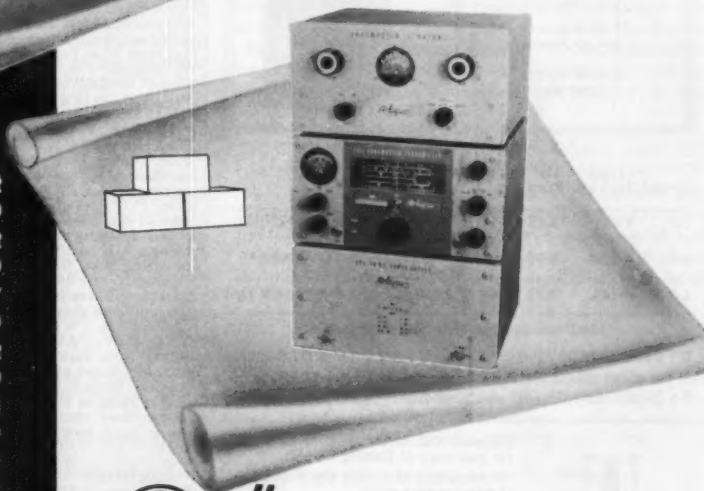
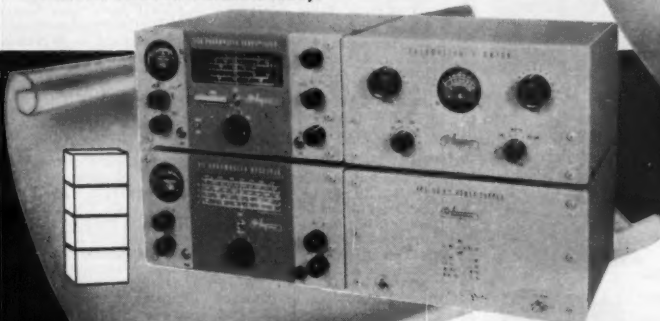
with *Harvey*-WELLS

"System Engineered" UNITS

One of the outstanding features of the new Bandmaster line is its adaptability to limited space. Each unit being only 12 3/4" x 10 1/2" x 6 3/4", a complete station including antenna tuner, transmitter, power supply and receiver need never be more than 25" wide by 13" high.

For the small house owner or apartment dweller this is extremely important. Yet the T-90 packs 90 watts into less than one-half a cubic foot.

Send for detailed literature today.



T-90 BANDMASTER XMTR
\$179.50

R-9 BANDMASTER RCVR
\$149.50

APS-90AC POWER SUPPLY
\$79.50

VPS-T90 MOBILE POWER
SUPPLY \$89.50

BANDMASTER Z MATCH
\$69.00

FIXED STATION SPEAKER
\$10.50

MOBILE SPEAKER
\$7.50

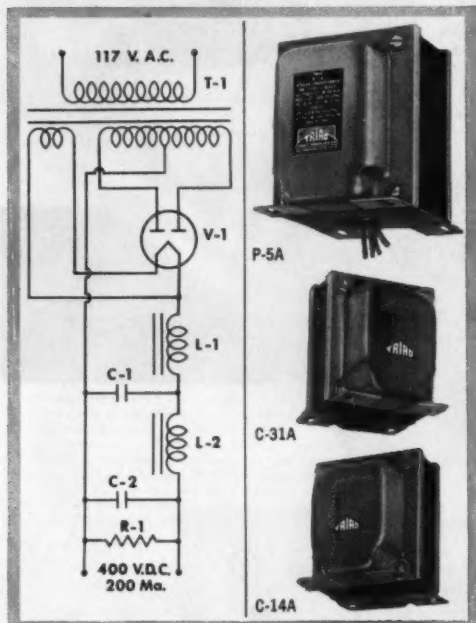
6/12 V. RCVR SUPPLY
\$28.50

Prices subject to change
without notice.

 **Harvey-WELLS**
ELECTRONICS, INC.
SOUTHBRIDGE, MASS. U.S.A.

GENERAL PURPOSE POWER SUPPLY

This power supply is ideally suited for transmitters operated under Novice class licenses. When higher R.F. power is added later on, this supply may be used as a modulator power supply.



Symbol	Triad Type No.	List Price	Characteristics
T-1	P-5A	16.75	1100V CT Output: 400V DC @250Ma 5V @ 4A Fil.
L-1	C-31A	8.20	25/5 H @ 20/200Ma DC 150 ohms 1500V Test
L-2	C-14A	5.85	6H @ 200Ma DC 150 ohms 1500V Test

Additional components required as follows:

C-1 2 mfd 600V Oil filled
C-2 4 mfd 600V Oil filled
If the above values are used, Ripple will not exceed 1.5%
R-1 20,000 ohms, 25 watt wire wound
V-1 5R4GY or 5U4G



4055 Redwood Ave., Venice, Calif.

See your distributor or write us direct for your copy of Catalog TR-55D
It completely describes the finest line of transformers made.



ZVO, TEO, QA, and BB reporting in. A new Novice in Winthrop is FHE, a YL. The following members of the Section I-B Net were on in the monthly test: DUO, SH, FWS, GNK, IPE, YFA, DW, KWD, WUW, CLF, MGL, ISU, ALP, AJU, VTT, MME, WFQ, ZWQ, VJD, MD, and KPX. Traffic: (May) K1WAB 1089, WIEMG 519, UKO 254, LYL 233, EPE 173, IBE 132, AVY 81, CLF 62, LM 37, WU 8, DFF 6, CAM 2, BB 1. (Apr.) K1WAB 953, W1BGW 52, QLT 8, ABJ 2.

WESTERN MASSACHUSETTS—SCM, Osborne R. McKernaghan, W1HRV—SEC: RRX, RM: BVR, PAM: QWJ. The WM C. W. Net meets on 3560 kc. Mon. through Sat. at 1900 EDST. The WM Phone Net meets on 3870 kc. Wed. at 1800 EDST. The Phone Net is coming along fine with SYX as net control and MNG liaison to the C. W. Net. A Section Net certificate was issued to WEF. VNH is a new EC. BYH, Fitchburg, is a new OPS. COF's OPS certificate was endorsed. AJX received a WANE certificate. YCU made WAS on phone with a Viking I. TVJ passed the 2nd-class commercial radiotelephone exam and will try for 1st-class soon. BVR had a visit from KH6AR. BYH and CKC have their General Class tickets. W1NDGL and CMS expect General Class tickets soon. ICW is C. D. Area 4 Radio Officer. QLZ has built a mobile rig. NPL is holding code practice for several SWLA. DPY is going s.a.b. with a 10-B. The Montachusett Amateur Radio Club, Fitchburg, is newly affiliated with ARRL. SPF reports hams in the Worcester Area did a fine job helping to locate a downed plane. The HCRA group of 30 enjoyed a visit to ARRL Hq. with BDI and CUT as hosts, followed by a trip to WIAW. The Amateur Radio Assn. of the University of Mass. has new officers: VSX, pres.; UAN, vice-pres.; San Soucie, treas.; URI, secy. The Worcester C. D. Phone Net drills Mon. at 1700 on 28.72 Mc. WPW, formerly of E. Mass., is active on the 75-meter traffic nets with a Viking II and a 5X99 from Athol W1NZBA and DOI have their General Class tickets. LRA is in charge of RACES communication in Westfield. A new Novice in Springfield is W1NFKP. ALL, LIW, TAY, OUI, and WXF are very active with mobiles. Traffic: W1HRV 146, BVR 112, RRX 85, WEF 78, MNG 48, ZUU 34, ABD 26, TAY 22, AJX 16, YCU 14, BYH 10, HRO 10, DPW 8, DPY 4, WPW 3.

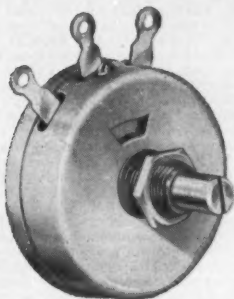
NEW HAMPSHIRE—SCM, Harold J. Preble, W1HS—SEC: BXU, RM: CRW and COC, PAM: CDX. Note that COC has been appointed an additional RM. He and CWX will divide the State between them. Contact either one for information. CDX is PAM and wants more OPSs for the traffic net. CCE has been appointed OPS. The Concord Brasspounders held an initiation May 14th. Ten candidates were made members. W1QGU/K2BH is back at Snowville for the summer. CWX made BPL in May. APK's son Bruce is now N1ECC. DAE has his General Class license. IP says traffic is slack and he is chasing DX. Welcome to Novices N1FTZ and N1ELW, father and son, also N1ECB, N1ECC, N1EEQ, N1EET, N1EFY, N1EJB, N1ELW, N1FCU, N1FDC, and N1HE. The Great Bay RA held its annual clam chowder May 21st at the Hampton Beach Fire Station. Seven radio clubs from Massachusetts and New Hampshire were represented. Many old-timers will be grieved to learn of the sudden death of ex-W1CMR, formerly of Manchester but later New York. ARR is working VKs, ZLs, and KH6s on 40-meter c.w. during the early morning hours. Traffic: (May) W1CRW 505, ARR 217, WUU 45, CCE 24, COC 19, HOU 16, FZ 9, CDX 7, IP 7. (Apr.) W1CRW 422, GMH 22, ZIV 13, WBM 12, YH 7.

RHODE ISLAND—SCM, Walter B. Hanson, jr. W1KKR—SEC: TQW, PAM: VXC, RM: BTV. The PRA Dinner Dance was attended by more than 250. AEI received the "outstanding ham" award, and there were prizes galore. CRA's new officers are BTV, pres.; ZPG, vice-pres.; POP, treas.; BQH, secy. The CRA also set up 2-meter gear at the YMCA and handled over 100 messages for the public, relaying to BTV and the First Regional Net. VXC reports RIIN on 29.260 Mc. really is rolling with more cities reporting in at 1930 EDST. YAO checks in on the Newport County Net on 29.530 Mc. and is working on an ARC-4 for 2 meters. There is much more activity on 10 meters since the band has shown signs of life. Heard regularly are MK, CEW, HJB, VWR, SBP, HEH, KKE, YYQ, and mobiles YKQ, BTV, OAV, and RVO. A report was received from 4CVO/1, via Rawlins, Wyo., who needed a vacation after a teaching course at NCRC. YNE is back on and racking up log time. He says the W4s are the best for QSLs. Lots of new gear is going in at the Situate Control Center. NZR can be found there almost every Saturday afternoon and could use a hand now and then with the equipment. Traffic: W1BTY 376, VXC 102, UTA 55, ZXA 31, ZPG 25, CEW 12, W4CVO/1 12, W1ZDS 8, YNE 6.

VERMONT—SCM, Robert L. Scott, W1RNA—Nets: VTN meets on 3520 kc. Mon., Wed., and Fri. at 1830 hours; VTPN on 3860 kc. Sun. only at 0930 hours; GMT on 3860 kc. Mon. through Fri. at 1200-1300 hours; Vt. C. D. Nets on 3993 and 3501.5 kc. Sun. at 1000 hours. Several of the boys have sent me AREC applications. Thanks for the new applications. They have been forwarded to our SEC, SIO, or Brattleboro. Ann, OAK, our RM, is working on net certificates for the c.w. gang. You would have had them sooner if it hadn't been for yours truly. I have been kind of lax in getting some of the things done I should have. Various

(Continued on page 90)

MALLORY HAM BULLETIN



Type "M" 4 Watts

For every amateur
or professional application...

MALLORY Wire Wound Controls

The year after year continued preference for Mallory wire-wound controls, in amateur handbook and magazine "how to build it" articles, is a wonderful testimonial to the technical skill and ability of Mallory engineering. Continued amateur patronage, plus enthusiastic acceptance by professional users, has made the production of small wire-wound controls at Mallory a highly controlled and uniform process.

The manufacture of high quality wire-wound controls has been a specialty at Mallory almost as long as such controls have been used by radiomen. As a result, practically every style and resistance value needed for amateur or professional application will be found listed in the latest Mallory catalog. There is a style or value for use in just about every circuit around the ham shack—"S" meter circuits, bias control in the cathode of RF, IF, and modulator tubes, excitation level adjustment in crystal oscillators, "T" and "L" attenuators, and all sorts of test equipment circuits, to mention only a few.

For your information and possible help the next time you require a wire-wound control, a few of those available in the latest Mallory catalog are listed and described below.

"C" TYPE 2 WATT WIRE-WOUND—This control is one of the smallest capable of dissipating a full 2 watts. It measures only $1\frac{1}{8}$ " in diameter, and as a result it is a handy control for many bias, "S" meter, and other low voltage applications where physical size is a factor. It features a grounded rotor arm, screw driver slotted shaft, and a full 266° of electrical rotation. Resistance values from 6 to 15,000 ohms are available.

"R" TYPE 2 WATT WIRE-WOUND—The "R" control has many amateur applications. Its 1500 volt AC insulation between shaft and resistance element, and its dust proof phenolic case, make this control safe for amateur circuits where high potentials may be encountered. The shaft is a thumb knurled and screw driver slotted stub $\frac{1}{4}$ " in diameter to which a special 3" extension shaft may be added when desired. The "R" control is made in resistances from 20 to 5000 ohms.

"M" TYPE 4 WATT WIRE-WOUND—This control is the old stand-by used by more amateurs than any other made. Wherever variable resistors of 4 watts or less are required, the "M" control should be the logical choice. With resistance values of 0.5 to 70,000 ohms available it is universally acceptable for voltage division, bias control and test instrument circuits of all kinds.

"E" TYPE 7 WATT WIRE-WOUND—The 7 watt "E" control fills the gap between the low power "C", "R", and "M" controls, and the higher power and more expensive units of 25 watts. This control is particularly well suited for use in screen grid and similar circuits where voltage division or adjustment is desired. Nine resistances are available from 5,000 to 150,000 ohms.

In addition, the Mallory catalog lists a variety of resistance values in "T" and "L" pads. Center-tapped wire-wound controls and units with tapered windings for special service are all available through your nearest Mallory Distributor. See him today for Mallory wire-wounds, power resistors, carbon controls and those other Mallory components you need to keep your equipment in good operating condition.

In the meantime, watch for the announcement of new Mallory power controls from 25 to 500 watts.

P. R. MALLORY & CO., Inc.
INDIANAPOLIS 6 INDIANA

P. R. MALLORY & CO. Inc.
MALLORY

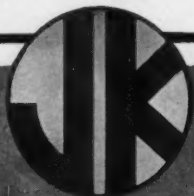
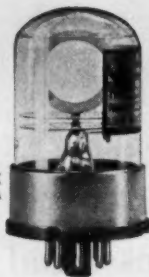
PRECISION GLASS ENCLOSED CRYSTALS

Crystals of extreme stability, over a complete range of 800 cycles to 5 mc.



(Actual Size)

JK
G-12A



PRODUCTS

FREQUENCY MANAGEMENT SPECIALISTS

TEMPERATURE CONTROL OVENS

Small, compact, light, uniform, to complete the environmental control picture. A wide variety available.



JK
H-17T



JK 09

MILITARY TYPES

Hermetic sealed, metal cased, in frequency ranges from 16 kc to 100 mc.



JK
H-17

- Custom Oscillators, Crystal Filter Networks.
- Suppliers of Quartz for Ultra Sonic Transducers.
- Complete customer engineering service provided for quartz crystal applications.



Write for technical catalog

THE JAMES KNIGHTS COMPANY
SANDWICH, ILLINOIS

certificates sent me for renewal, as well as new appointment certificates, should be in your hands by the time you read this — I said should be! My apologies to all. Traffic: W10AK 125, AVP 100, RNA 50, IT 38, BJP 30, KJG 13.

NORTHWESTERN DIVISION

IDAHO — SCM, Alan K. Ross, W7IWU — Kellogg: EC RQG reports that WHZ has dropped the "N" from his call. RSQ's XYL is now WN7ZPP. Ririe: LQU had a nice vacation at Victoria, B. C., visiting VE7s SW, WL, and YU. Gifford: VWS knocked off contacts at the rate of 4 per day during May, with a little DX like KG1AA, VESCG, and Greenland on the side. A nice letter was received from FIS, now in Missoula, formerly from Hayden Lake. The rig still is a Bendix TA-12 and an SX-24 receiver. The Hammond organ also is competing with ham radio. Emmett: HOV is the new EC for Emmett and Gem County. TYG still is doing FB with the "Hambone." Boise: DOH is the new EC for Boise. SUZ has a new Ranger and also is working on a radio-controlled model plane. SHN moved to Burley with the CAA. You fellows with QTHs and calls not listed above, please drop me a line. Traffic: W7RQG 25, IWU 6, VWS 2.

MONTANA — SCM, Leslie E. Crouter, W7CT — The Billings Emergency Corps is continuously monitoring 3920 kc. from 9 a.m. until 9 p.m. daily except Sun. and holidays. MVN has moved to Glendive to take a new job in the radio phone service for the Mountain States Telephone and Telegraph Co. CT has started construction on his new home in Helena. Les will have a 15-by-20-foot room in the basement finished suitable for his radio shack and also is going to put up a center-fed 80-meter antenna on 60-foot poles. MOF recently moved to Billings and is sporting 160 watts mobile. YLH now is operating s.s.b. GFV is using his new recently-built mobile rig. SMY has a new vertical 44 feet high and is working 40 and 75 meters with it. RDN has a new 2-meter rig. TTC is working for the Yellowstone Park Forest Service this season. LBK is building a new garage 32 by 24 feet. KGF, GFV, and YZQ are redesigning and rebuilding the club rig for the Billings gang. OQI will have the amateur radio booth at the Yellowstone County Air again this year and will have a rig on the air hoping to impress the public by conducting an emergency drill from the fair grounds. Traffic: W7LBK 9, MQI 2.

OREGON — SCM, Edward F. Conyngham, W7ESJ — The OO reports indicate many 80-meter Novice operators have not checked for second harmonics — outside the band. ISP advises that the Medford 10-meter Net is drilling each week for AREC work. QCL, MAO, KAB, QVY, SCF, and TMF are all busy building 160-meter rigs. PRA has a new HRO-60 and tape recorder. VBF graduated from high school and now is QRL building a 2-meter rig. TIR reports his dad has dropped the "N" from his call. UXR. VLE still has 12 foot of snow, which is preventing him from doing antenna work. EZR reports the Grants Pass Radio Club held its annual picnic with an estimated 25 mobiles and an attendance of about 95. YET and LNG, from Medford, and FRO, ULK, and DBZ, from Ashland, attended. APF still is battling Tennessee Valley Indians. UZU now has a new 50-foot mast for a beam to go with his one-quarter-mile antenna. UJ and FKS are off for vacation. RIM is off to summer camp and more school. UNY has completed installation of K7WBI. JRJ and SBU are heard on 160 meters often. Traffic: W7ZFD 456, APF 252, QKU 129, WLL 114, WAT 75, BVH 39, PRA 33, THX 33, TIR 31, BDU 29, OMO 21, HDN 15, LT 8.

WASHINGTON — SCM, Victor S. Gish, W7FIX — SEC: RCM. RM: RXH. PAMs: EHH and PGY. YJE advises that 21 of the boys now are checking in on 6 meters. State Civil Defense is attempting to enlist the services of net members to round out the radio relay system. BA visited 6NCP on a trip to W6-Land. TMO is putting up a 50-ft. Trylon tower and 20-meter beam. PHO still is chasing DX and the boys are mazing him about his fist. WAM is adding lines to his agency representation — Ray and the XYL "Henry" (WN7YQS), regulars at the North Seattle Club. K6BDF/7 is asking about underground antennas to get away from summer QRN. VI is handling traffic on UTL 40-meter schedule. PGY has a new Morrow receiver and converter for his mobile. JPH has a new QTH north of town. CBE built a new "Q" multiplier that really does the work. TWQ reports for the Marysville High School Club. Club equipment was loaned out for the summer to YGL and YHR. The traffic boys are worried about the ban on KA traffic. A new 'phone traffic net is in the offing, covering RN7 territory. FRU is griping about military stations accepting Armed Forces Day traffic for the Far East when traffic was not accepted overseas. OE has the shack completely remodeled with a Ranger, SX-99 and control panel all within easy reach. AIB still is experimenting with antennas. ULK found her Viking trouble. FZB copied 60WP for 35-w.p.m. CP certificate. GAT, as with all publishers, is QRL. RHD is completing the 813 rig, modulated by 811s. LVB is building a big rig with parts from the OM, 6HTN. AVM still is waiting for a break in the weather to get up his 2-meter beam. JEY has a new mobile on 75 meters. UZB is starting a 2-meter net, 145.8 Mc. 8 p.m. Tue. UKI is working on 420-Mc. gear. CWN is DXing on 20 meters. PKR is uranium hunting. ULA built a new

(Continued on page 98)

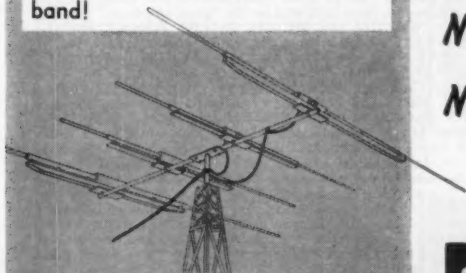
The **Mosley** "Vest-Pocket"

TRI-BANDER ROTARY BEAM

with ***AUTO-LECTRONIC** Change-over

- ✓ ONE Beam
- ✓ ONE Coax Line

*All you do is tune your rig for operation in the band desired. The MOSLEY TRI-BANDER automatically selects the right combination of elements to give True Beam Performance on that band!



The Tri-Bander is a compensated type beam with four elements mounted on one 15' boom. Two elements function for 20 meter operation and the other two for 15 and 40 meter. Because the latter two bands are not in direct harmonic relation, the beam operates at somewhat reduced efficiency at 21 mcs. but gives maximum performance at 7 mcs. and 14 mcs. Forward gain on these bands is 5 db. and front-to-back is 20 db. SWR is 1.1/1 at resonant frequencies. The Tri-Bander is complete with coils, Auto-Lectronic Coupling Yoke and all necessary hardware. Element sections are pre-drilled and color coded for fast assembly.

Model VPA-3B. Amateur Net \$135.00

3 BAND OPERATION!

No Switching!

No Stacking!

No Adjusting!

just one
MODEL VPA 3B
TRI-BANDER

Pre-tuned!

15 METER

20 METER

40 METER

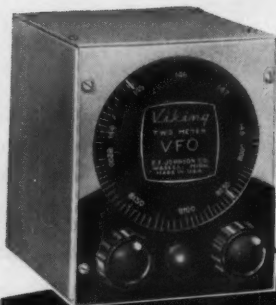
Hams owning a 20 or 40 Meter MOSLEY 'V-P' Beam are invited to write for conversion data. Address Engineering Dept.

Write for your FREE copy of MOSLEY Catalog H-55. Describes other popular 'V-P' Rotary Beam Antenna Models and products of interest to Hams.

Mosley Electronics, Inc.

8622 ST. CHARLES ROCK ROAD, ST. LOUIS 14, MISSOURI

NEW for VHF



Operate any frequency in the two meter band! Replace those 8 mc crystals with this compact, easy-to-assemble VFO kit

JOHNSON TWO METER VFO

Temperature compensated and extremely stable, this compact Two Meter VFO kit is designed to replace 8 mc crystals in most existing two meter transmitters, including types using overtone oscillators. The easy-to-read, edge-lighted lucite dial is calibrated from 144 to 148 mc with 7 to 1 vernier tuning provided . . . output frequency range is 7.995 mc to 8.235 mc and a separate 7.995 to 8.235 mc dial calibration is provided to facilitate calibrating the unit with 8 mc crystals. Power requirements are only 6.3 volts at .3 amp and 250 to 325 volts at 10 ma and may be taken from the transmitter with which the VFO is used. (Power cable and octal power plug are furnished with the unit.) Tube line-up: 6BH6 series tuned oscillator and an OA2 voltage regulator. Dimensions, only 4" x 4½" x 5".

Cat. No. 240-132 Viking Two Meter VFO Kit including complete assembly instructions, tubes and pre-calibrated dial

\$2950

Amateur Net

Cat. No. 240-132-2 Viking Two Meter VFO, wired, calibrated and tested with tubes

\$4650

Amateur Net



E. F. JOHNSON COMPANY

2833 Second Avenue Southwest • Waseca, Minnesota

antenna-tuner which licked most of his BCI. HDT is trying out 2 meters. TIQ is de-bugging the rig, but is active on c.d. and MARS. Traffic: W7BA 1574, PGY 1267, VAZ 866, FRU 569, OE 107, USO 99, APS 89, UYL 59, RXH 51, UIN 46, FIX 21, K6BDF/7 18, W7EHH 16, FWD 16, AIB 14, PQT 14, HDT 10, LVB 10, GAT 9, EVW 6, FZB 4, ULK 4, AVM 3, JEY 2, RHD 2, YJE 2, UZB 1.

PACIFIC DIVISION

HAWAII—SCM, Samuel H. Lewbel, KH6AED—Here is the call for the c.w. gang. Get in touch with your SCM and we'll get an all-islands c.w. net going. Once that is rolling, we will arrange for scheduled outlet into the transcontinental system for deliveries into all the states. With 2-meter activity on the upcoming 3 OES appointments were made: KH6LD Henry Loo, KH6ZD Lawrence Ching, and OS Tom Hori. LD, mobile on Maui, and AED, on Oahu, made 2-meter history with an inter-island contact. LD is running less than 2 watts output to a ground plane on the roof of the car. Who will be first with the Hawaii-Oahu contact? Traffic: (May) KH6AJF 1895, KA2GE 850, MA 812, AK 538, KR6KS 331, KA2HQ 232. (Apr.) KA2GE 1006.

SANTA CLARA VALLEY—SCM, R. Paul Tibbs, W6WGO—SEC: NVO. ZRJ tuned up his antenna and is getting out very well now, thanks to George Grammer's advice. Doc and Ann attended the Pacific Division Convention at Fresno. K6CRN is working on MARS under the call AA6CRN. FON received his license renewal. AIT finished power supply for a new final using a pair of 811s. YHM returned from the East Coast in time to attend the Convention at Fresno. Don left for KL7-Land a few days after returning from the Convention and expects to be in Alaska for about three months. On his return he will be back on the traffic nets again. KIN just finished a 20-meter beam using inductive coupling rings. Others at the Convention were K6BBD, W6HC, WGO, SHK, APV, YPM, FYM, and BPT. ZRJ now is Manager of RN6. Doc should have the net operating on a five-night basis again by the time this is read. NCN needs more stations in Northern California so as to be truly NCN. Stations are needed in Sacramento and up Redding way. Anyone in the Mt. Shasta Area will be welcome. There also is need for a station from the phone nets to work on RN6. Traffic, both outgoing and incoming, would then be handled much faster. How about it, gang? Let's make this section again a leader in traffic-handling as it was in the "good old days." Traffic: (May) W6YHM 138, HC 135, ZRJ 67, FON 61, K6BBD 52, W6AIT 39, UTV 36, K6BAM 33. (Apr.) W6HC 95.

EAST BAY—SCM, Guy Black, W6RLB—Asst. SCM for V.H.F.: Ollie Nelson, 6MXQ. Asst. SCM for TVI: Harry Cameron, 6RVC. SEC: WGM. PAM: LL. RMs: IPW, EEF, and JOH. JZ reports he is looking forward with pleasure to a period of relaxing from the duties of office. Maybe he will get some of that equipment built. US now is permanently in Los Angeles. EE is at Zephyr Cove, Lake Tahoe. One of our old-timers, Bud Stedinger, CX, passed away suddenly. LHJ is a very active new Novice in Centerville. The *SARO News* is one of the better and more complete club papers published in Northern California. The East Bay section was well represented at the Pacific Division Convention in Fresno, and assisted the Fresno gang in many ways with the programs. "Operation Alert 1955" saw amateurs participating fully. Several civil defense leaders have gone out of their way to express their full appreciation. ITH has been traveling through a fascinating bunch of DX countries. The Albany Hi-Hi CQers club station, K6EPE, is now an Official Bulletin Station. The East Bay Radio Club heard talks by Walt Serniuk, K6HQE, formerly W2JAR, and Ray Renaudo, W6KEV, in May and June. The V.H.F. Party in June was highlighted by the activity of the V.H.F. Expeditionary Society, which set up equipment at a spot on route 88 known as Ham's Station, California. Traffic: K6GK 125, EPC 24, W6YDI 2.

SAN FRANCISCO—SCM, Walter A. Buckley, W6GCG—Asst. SCM: William T. Nakahara, 6GHI. The Sonoma County Radio Club had ALF as guest speaker for its May meeting. Frank gave an interesting demonstration and talk on the tune-up procedure of his beams. LOU's XYL, Mae, is waiting for her Technician Class ticket and K6ITY's XYL, Joan, is awaiting her Novice Class ticket. K6BWQ moved from the Bay Area and has settled down in Eureka, Calif. He is one of the telephone company's salesmen. Members of the San Francisco Naval Shipyard Club held their annual dinner at the El Portal Cafe May 21st. Your SCM had to miss it as the family had tickets for the Fresno Convention. HAMS (the Red Cross Club) had Field Day business and a 6-meter discussion at its May meeting. SDN, KFS, URA, TTB, JAA, CAN, ULA, OJT, PBC, GCG, VWK, VJI, BAZ, YQI, AJF, VSV, BHR, JKN, MXQ, K6s ELV, EGU, ELU, HHL, NCG, APB, BAO, BEZ, and GGC are all listed as 6-meter boys locally. K6ELV now is mobile on that band. Net control for 6 meters is URA, who sports an unhooked-up 829B Tripler final and a four-element beam. Neighbors can't blame him for TVI. Many of the local 29ers Club showed up at Fresno but the 10-meter transmitter hunt signal was not loud enough to be heard by the gang. The 75-meter transmitter

(Continued on page 94)

Towers! Towers! Towers!

CRANK UP and DOWN • TILT OVER • HURRICANE PROOF



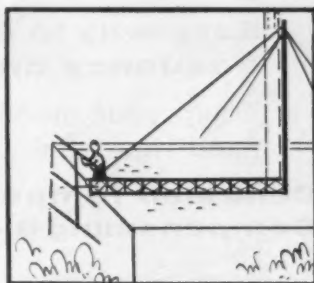
The E-Z Way Rotary Beam Tower is the answer to a Ham's dream! Tilts over, cranks up and down—and so easy to install. Antenna adjusted in a wink. Ground post is included. You'll find E-Z Way Towers the sturdiest and most versatile towers in the sky.

Six types made from 40 to 65 feet. Each designed for different antenna loads at specific heights. Cranks down and tilts over for easy adjustment. No guy wires needed. These towers are also available with brackets for attaching to building wall at lower prices. No ground post necessary when attached to building.

TILT OVER Ground Post

FOLD OVER

Three types of Fold Over with gin poles in 40 and 50 foot heights. Cranks up and down. No guy wires needed on tower.



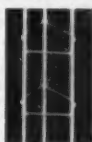
Gin Pole mounting is 20' galvanized structural iron pipe with double hinged base and crank, pulley, cable to crank to perpendicular position. V bracket locks to tower.



Provisions to mount rotor inside top of tower. Bearing at A and B relieves all strain from rotor.

BUILD IT YOURSELF

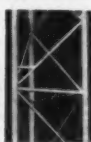
20 foot lengths for easy assembly to any heights desired. 320?



C-10
Width 10"
Maximum Height 120 ft.
Guy Spacing 27 ft.
Weight per ft. 4.5 lbs.



C-15
Width 14"
Maximum Height 200 ft.
Guy Spacing 40 ft.
Weight per ft. 8 lbs.



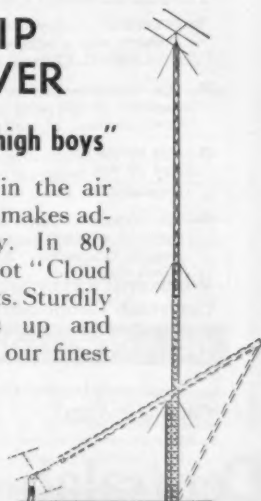
C-25
Width 25"
Maximum Height 320 ft.
Guy Spacing 80 ft.
Weight per ft. 20 lbs.

Used extensively for VHF and UHF communications antennas. Two other sizes available. When maximum height and guy spacing are not exceeded, tower will withstand 60 lb. wind load.

FLIP OVER

"for the mile-high boys"

Gets you up in the air but Flip Over makes adjustment easy. In 80, 100 and 120 foot "Cloud Buster" heights. Sturdily made, cranks up and down. One of our finest towers.



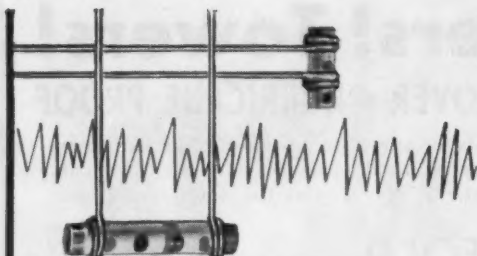
WRITE DEPT. T FOR CATALOG

When writing, please specify type of tower in which you are interested, height and expected antenna load.

E-Z WAY TOWERS INC.

5901 E. BROADWAY
P. O. BOX 5491

PHONE 4-3916
TAMPA, FLORIDA



Easy way to control frequency drift

Equip your mobile and fixed rigs with

Centralab Temperature-Compensating Hi-Kaps®

A wide range of values to choose from — to get close tolerances . . . high physical strength . . . high lead strength . . . fast response to temperature change.

There are four basic types of Centralab Temperature-Compensating Tubular Ceramic Capacitors:

1. **TCZ (NPO)** — Shows no appreciable change in capacity over a temperature range from -20°C to $+85^{\circ}\text{C}$. Capacities, .5 mmf. to 300 mmf.
2. **TCA (N330)** — Shows a negative change in capacity of 330 parts per million per degree C. Capacities, 10 mmf. to 100 mmf.
3. **TCN (N750)** Shows a negative change in capacity of 750 parts per million per degree C. Capacity, 3.3 mmf. to 750 mmf.
4. **TCL (N1500)** — Shows a negative change in capacity of 1500 parts per million per degree C. Capacities, 3.3 mmf. to 750 mmf.

When drift's your problem, lick it with Centralab Temperature-Compensating Hi-Kaps. Get them from your Centralab distributor.

Send coupon for Centralab Catalog No. 29.

Centralab

D-1955

A DIVISION OF GLOBE-UNION INC.
9121 E. Keefe Avenue, Milwaukee 1, Wisconsin

Send me Centralab Catalog No. 29

Name _____
Company _____
Address _____
City _____ Zone _____ State _____

hunt was a huge success, though. Wrong-way CTH was last in; they almost sent a search party out to find him. 1DE spoke on modern trends in amateur receivers at the U. C. Campus on May 24th. Sorry he couldn't stop over longer and give the same talk to some of the local radio clubs. Sixty-nine members of the Mobileers held Sunday morning breakfast at the Belmont Motel at Fresno. Mr. Morrow, of the Morrow Co., gave a very interesting talk after breakfast and told the boys how to eliminate some of the mobile transmission noises. OPL's XYL won the main prize at the YL's luncheon. GGC and family enjoyed the Friday night dinner with the Buzzards. There was a grand entertainment after dinner. Dr. Lester Reukema, of U.C., spoke at the May meeting of the SFRC on "Industrial Application of Atomic Energy." The fellows kept him busy answering questions after a very interesting talk. Thanks to ATO for obtaining such a wonderful speaker. BIP was a very busy man in May getting rigs and manpower in line for the SFRC Field Day. YL Splitter, the local YLRCSF Club paper, notes new members as K6AIU, W6DHF, and K6BMQ. K6EEE opened her home to YLs, OMs, and jr. operators on May 14th. Even the OMs admitted that they had a grand time. Rae, the 17-year-old YL of GGC, made a "writing date" with some of the boys at Litchfield Pk. and said she should have studied code because Gordon's dad was sending c.w. FVK came back via 'phone so she only heard a one-sided conversation. PHS, the OM of QMO, promises to write some short articles about radio theory for the YL Club. OMO is checking in again with MTN but stays on the American Legion frequency most of the time. AHH lost his way and couldn't even make it in last at the May 29ers hunt. KN6HIW completed a custom-built console for her rig. GQA sent in a most interesting OO report. He gave a frequency check to one of the Mexican stations. He says he expects a lull in activity for the summer months. CBE noted that he had very pleasant visit with the Headquarters gang in Chicago during the recent Elect. Parts Show. Sorry to have to list Dr. Turkel, OVM, on the Silent Keys list. Condolences to his family. Traffic: W6QMO 309, GGC 43, GHI 42.

SACRAMENTO VALLEY — SCM, Harold L. Lucero, W6JDN — ASI finished a pair of 4-400As in Lin amp. for his s.s.b. 20-A. JEQ is having trouble with his mobile in the new station wagon. HSB is counting the days until his retirement in August, when he will have full time for ham radio. LLR has his BC-610 TVled and puts out a whale of a signal on 75 meters. MIW has a new Viking Ranger and is planning an amplifier for it. ILZ has another call at his business location, K6KPG, and is running a full gallon. ESZ, master craftsman with a lathe, should see his equipment on all bands. DBA has the TCS mounted in his car and is active on MARS. ROO has the GO-9 on with vertical antenna and is DXing on 40 meters. RNR assumed the prexy job of SARC and is busy on 75- and 20-meter 'phone. QDT, having moved to Modesto, reports he is active on MARS now with 250 watts and a temporary horizontal antenna, and is going on 144 Mc. GDJ is DXing on 20 meters with a new antenna system. AK has returned from an extended trip to Detroit for a new Cadillac and brought back an SSB-20A and a new 75A-4 receiver. GWK is active on 75 meters. MYT is active on MARS and in frequency measuring work. TYC, with CMQ and approximately thirty mobileers, on June 5th mobiled to Pollock Pines on Highway 50 for a picnic, transmitter hunt, and family day. WUE, new operator at the McClellan MARS station, is active on the American Legion Net on 3975 kc. K6LCY, a ham of years ago, returned to the amateur ranks with a new call. Welcome back, DEO is active in c.d. work. The Convention has passed so now let's look forward to the National Convention that is coming to the West Coast. Traffic: W6CMA 82.

SAN JOAQUIN VALLEY — SCM, Edward L. Bewley, W6GIW — SEC: EBL RM: K6EVM, PAM: WJF. The Pacific Division Convention held at Fresno was a huge success, with an attendance of 752. The gang at Fresno is to be congratulated for a swell job. Word has been received that WJF and FEA are leaving this section and moving to San Francisco. I received a letter from TFD. Eldon is on an LST in the Japanese waters. K6BMM has a Gonset converter and a new dynamometer in the car. ADB has converted a BC-453 to an s.s.b. exciter. Very few reports were received this month, and as this will be my last report as SCM I wish to thank all the gang who have helped me and the section in the last two years. The San Joaquin Valley section has made great strides in organization and activity, and it is all because of the splendid cooperation of the whole gang. K6EVM announces a change in CVN time to 8:00 P.M. Chuck is working hard to keep the section net operating, and would like to see more stations take a part in the net. The section nets are the heart of the National Traffic System, and offer a wonderful opportunity for those interested in c.w. to get in some pleasant operating time. There is room for the beginner as well as the old-timer on the net, and the section net is ideal for the slow operator who wants to increase his speed. Check in on 3525 kc. at 8:00 P.M. Traffic: W6FAE 314, ADB 220, K6EVM 64, W6EBL 21, K6BMM 5, W6WJF 2.

(Continued on page 96)

Now -- 2 Pre-Tuned Beams on ONE BOOM

MULTIBAND

SHORTBEAM

TRADE
MARK
REGISTERED

PRE-TUNED!

For All
Combina-
tions of

20-10
20-15
15-10
40-20

	20 — 10	20 — 15	15 — 10	40 — 20
No. of Elements	3 El. "Shortbeam" on 20 3 El. Full Size on 10	3 El. "Shortbeam" on 20 3 El. "Shortbeam" on 15	3 El. "Shortbeam" on 15 3 El. Full Size on 10	2 El. "Shortbeam" on 40 2 El. Full Size on 20
Boom Length	16 Feet	16 Feet	12 Feet	12 Feet
Longest Element Length	16 Feet on 20 16 Feet on 10	16 Feet on 20 13 Feet on 15	13 Feet on 15 16 Feet on 10	33 Feet on 40 33 Feet on 20
Forward gain reference to full size dipole	4.8 db on 20 8.8 db on 10	4.8 db on 20 4.8 db on 15	4.8 db on 15 8.8 db on 10	4.4 db on 40 5.6 db on 20
Front to Back Ratio	20 db on 20 25 db on 10	20 db on 20 20 db on 15	20 db on 15 25 db on 10	15 db on 40 20 db on 20
Approx. Weight	30 lbs.	35 lbs.	28 lbs.	48 lbs.
Impedance match	52 ohms on both bands	52 ohms on both bands	52 ohms on both bands.	52 ohms on both bands.
Element Construction	61ST6 $\frac{7}{8}$ "- $\frac{3}{4}$ " dia. Alum. both bands	61ST6 $\frac{7}{8}$ "- $\frac{3}{4}$ " dia. Alum. both bands	61ST6 $\frac{7}{8}$ "- $\frac{3}{4}$ " dia. Alum. both bands	61ST6 $1\frac{1}{4}$ "- $1\frac{1}{8}$ " dia. Alum. both bands.
Amateur Net	\$97.50	\$107.50	\$94.50	\$127.50

NOW the amateur who wishes to go on any combination of 10, 15, 20 and 40 meters can do so without employing large and expensive mass installations. This newest R. S. MULTIBAND SHORTBEAM assures you of high performance on any combination of

these bands. All coils enclosed in weather-proof bakelite containers and wound with #12 Formvar wire. Will handle power up to 1 Kw. and operate with one T.V. rotator. All beams pre-tuned to band centers. SWR at resonant frequency below 1:1.

Complete Line of Ready To Use Pre-Tuned Shortbeams

20 meter 2 element.....\$49.95
20 meter 3 element.....59.95
15 meter 2 element.....44.95
15 meter 3 element.....54.95

40 meter 2 element.....\$74.95

10/80 meter shortdublet coils, (Per pair per band)
.....14.95

Available Through Your Distributor — Write For Catalog M2

RADIO SPECIALTIES, INC.

354 SEVENTH AVE.
BROOKLYN 15, N. Y.

HAM Headquarters For The South

ELECTRONIC SUPPLY

61 N.E. 9th ST. MIAMI 32, FLA.
Phone 9-4512 Teletype MM 186-X



As low as 10% down
18 months to pay

HALLICRAFTERS HT-31 LINEAR POWER AMPLIFIER

This new Hallicrafters power amplifier now puts the equivalent "talk power" of a one kw conventional AM transmitter right on your operating desk. Here in one compact package is a full band switch power amplifier covering 80 to 10 meters, that's easy to drive, highly stable, extremely versatile, and engineered to Hallicrafters world-famous quality.

\$395.00

**WE OFFER
HIGH TRADES**

**SATISFACTION
GUARANTEED**
or your money
refunded after
10 day trial.

LISTEN
TO THIS
POPULAR
RECEIVER
IN OUR
"HAM
SHACK"

Write For Further Information (FRANK W4ICE)
Electronic Supply • 61 N.E. 9th St., Miami 32, Fla.

- On () EZ PAYMENT PLAN
() HAM FLYER
() ADD TO MAILING LIST

NAME _____

ADDRESS _____

CITY _____

ROANOKE DIVISION

NORTH CAROLINA—SCM, Charles H. Brydges, W4WXX—SEC: ZG, PAM: ONM, RM: VHH, CVX has a new HRO-5 receiver and has completed WAC-phone on 20 meters. SOD has a new Viking Ranger and Viking KW plus vertical. The Roberson Emergency Net meets on Wed. at 4:30 on 28,800 kc. ACY reports 22 members on 144 Mc. in the Greensboro Area. The Greensboro 2-meter Net meets at 1800 on 146.88 Mc. BDU reports that his new Vertical worked swell in the CD party. BUA put up a new Windom antenna and had some surprising results on 75 meters. EZH is getting his antenna working well on 75 meters with his Globe King. GHQ has his modulator working again plus a new antenna and is having lots of fun. I received only a few reports about a North Carolina traffic net. If any more of you are interested, please drop me a line and maybe we can organize a good net. SOD reports that the Tarnetto Amateur Club has received its notice of affiliation with ARRL. CEN is working Gs and handling messages on 20 meters. The Confederate Teenage Net is meeting on 3950 kc. at 4:00 P.M. for the duration of the summer. YPY is working 40-meter c.w.-phone with good results to W6-Land. ZKE has a new 8X-96 receiver and Charlie also is working on a 20-meter beam and a 35-ft. pole for support. BDU, VHH, and WXX were on for the CD Party and a good time was had. FNV finally got his Globe Scout working and is back on 75 meters. VFK was in the hospital but now is back in the swing and doing FB. FHI has a new single 813 and is doing a good job on 75 meters with about 300 watts. Thanks to all for the fine reports. Traffic: W4BDU 36, DRC 20, WXX 18, YPY 8, ACY 6, ZKE 6, BUA 4, BUW 4.

SOUTH CAROLINA—SCM, T. Hunter Wood, W4ANK—9JBN/4 reports that K4ADO has a new Globe Scout on the air from Myrtle Beach. YAA has graduated from Clemson and will be on 'phone soon with a BC-696 using screen modulation. LXX reports from Florence that he plans to bandswitch his transmitter, that FGX is receiving rare DX cards and needs only two for WAS, and that AUL, TSU, and LLH were erroneously reported as planning high-power mobile. They are planning high-power home rigs. TSU has almost finished his kw. rig. AUL soon will be on the low end of 20 meters with his half-gallon. On May 13th the Governor signed into law a bill authorizing full-size license plates for South Carolina hams. The amateur plates with calls will be displayed in lieu of regular plates. Regular plates must be obtained but the amateur plates will be displayed. Cost of the amateur plates is \$1.00 in addition to the regular license fee. Novice or commercial vehicles are not eligible. NJG, GQV, HDR, and HMG deserve special mention for successful efforts in facilitating passage of this bill. Principal supporters in the General Assembly were Senators Grant of Chester, Spigner of Columbia, Wallace of York, and Representative Cushman of Aiken. Mr. John Denny, Esq., Columbia attorney, also deserves special mention. Traffic: W4HDR 308, AKC 123, FFH 59, ANK 82, K4ADD 38, W4FML 22, YAA 17, W9JBN/43, W4YAA 2.

VIRGINIA—SCM, John Carl Morgan, W4KX—SEC: RTV. Reports are gratifyingly plentiful this month. Thanks, gang. PFC and BLR made BPL, Kay's second leg on that medallion. We enjoyed meeting so many at the VFN picnic at HQN's. Details on the Virginia QSO party will appear next month. New clubs include the C. & O. Ry. Employees ARC in the Richmond Area and the South-western Va. ARC, with headquarters in Radford. The Tidewater Mobile Club did the usual fine job on the Marathon Outboard Races. The Shenandoah Valley ARC has a fine new club house. The Central Valley ARC is operating an active local net on 29,456 kc. K4NCP is the club station at FADTC Dam Neck. New VFN mgr. YVG is QRL tooting the sax at Virginia Beach. The new VFN asst. mgr. is KZS. ONV continues as secy-treas. PXA is keeping VN boiling five nights a week through the summer, with newer members "breaking in" as NCS. The younger contingent, including APM, WDX, TFX, ZFV, and others, say they'll be more active now that school is out. K4ASU is making a net directory of VN/VSN and wants the complete dope on all. There are complaints aplenty on QRM on 4RN's frequency. Welcome to ex-Minnesota SCM, 0EPJ, now 4EPJ. KVM is now KG1JB in Greenland, according to KFC, who snagged MP4QAL for No. 227. ZZL is taking portable to his summer job at Shrine Mont. Squirts KN4BBR and KN4CAX snagged LU1EK in the Novice band! K4BNI/BNG report activity in the Warrenton Area. K4CQZ and 2JWD/4 are readying 2-meter gear on the Eastern Shore. JUJ is back chasing DX on 20 meters. AAD finally is taming the 833-A final. CWB's big vertical is amusing passerby, who stop to ask if he is "knocking off their ball games." Fortunately he can say no. Traffic: W4PFC 819, BLR 743, AMZ 128, CGE 57, YVG 43, K4ASU 39, W4YKB 33, PXA 29, EPJ 27, WYC 15, K4NCP 14, W4AAD 10, APM 8, TYC 7, WDX 6, KFC 5, JUJ 4, LW 4, IF 2.

WEST VIRGINIA—SCM, Albert H. Hix, W8PQQ—SEC: YPR. PAM: GCZ. RM: DFC, GBF, HZA, and JWX. The Princeton Club had a good turnout at its recent picnic. It is requested that all hams in the State who can

(Continued on page 98)

ATTENTION:

PHILCO

**All Qualified Communication
& Radar Personnel**

**The World's Largest Field Service Organization
Needs YOU Now!**

**IMMEDIATE OPENINGS AT ALL LEVELS
AND IN ALL FIELDS OF ELECTRONICS**

ENGINEERS and SPECIALISTS alike . . . if you are qualified by experience or training in the design, maintenance and instruction of Communication, Radar and Sonar Equipment — Philco NEEDS YOU NOW! The assignment: a wide range of commercial and government operations to service on a long range basis.

As the world-pioneer in servic-

ing electronic equipment, UNLIMITED OPPORTUNITY and JOB SECURITY are more than just "sales talk" . . . in addition to TOP COMPENSATION and special assignment bonuses, PHILCO'S many valued benefits include hospitalization, group insurance, profit sharing, retirement benefits, merit and faithful service salary increases.

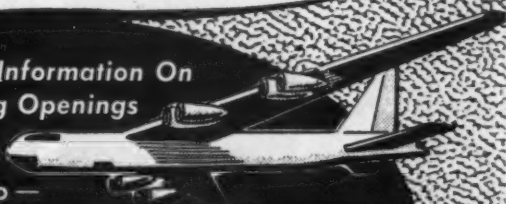
Join The Pioneer In The Servicing of Electronic Equipment

**For Detailed Information On
These Challenging Openings**

**... Write NOW
In Confidence To —**

**PHILCO TECHREP
DIVISION**

**22ND & LEHIGH AVENUE
PHILADELPHIA 32, PA.**



TRY IT!

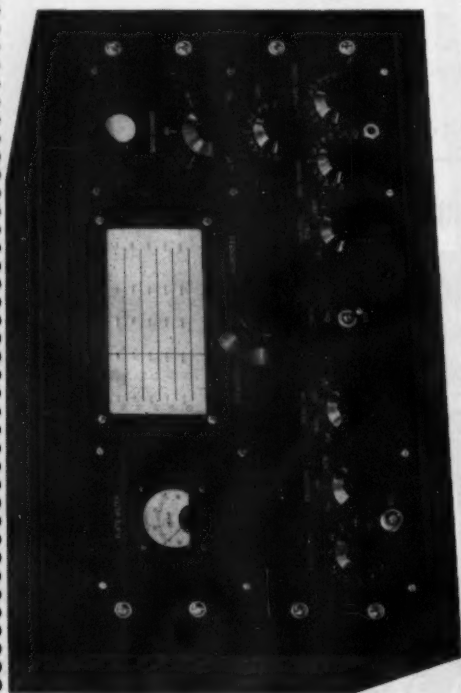
We invite you to see and operate the Eldico Single Sideband Communication Equipment at the

ARRL

Roanoke Div. Convention, Aug. 12, 13, 14, 1955
Chamberlin Hotel, Old Point Comfort, Virginia

ELDICO OF NEW YORK, INC.

72 EAST SECOND STREET
MINEOLA, LONG ISLAND, NEW YORK



assist in emergency work, register as AREC members with the SEC and ECA. Please take time now to drop YPR a card in reference to this. IRN just completed a new kw. rig. The Clarksburg Club is enjoying an increase in activity. JWJ has a new VFO and rig. BWK is in the process of putting up a new 60-ft. antenna pole. NYH is very QRL now but manages to keep on the air. The West Virginia C.W. Net will operate a summer schedule on Mon., Wed., and Fri., at 7:00 p.m. EST through the month of August. OIC plans to increase power soon. GCN is doing a bang-up job with his s.s.b. rig. TMI also is on with an s.s.b. rig and is becoming quite active after moving from W4-Land. 3LEZ, president of the Frankfort Club, visited PQQ. TDG is very active on the various bands. BDD is heard on 20-meter 'phone often. I would appreciate having more activity information from all the hams throughout the State. CHP and LSG both have Minibeams on 20 meters which work out quite well. Traffic: W8JWX 163, HZA 130, GEP 115, LYV 65, IXG 58, DFC 22, PZT 21, NYH 20, BWK 15, SEV 12, PRT 8, PQQ 7, UYR 4.

ROCKY MOUNTAIN DIVISION

UTAH — SCM, Floyd L. Hinshaw, W7UTM — The UARC of Salt Lake City is faced with replacement of its president because of the resignation of UKB. Burns advises he has to be out of town too much to do justice to the club. We are sorry to hear he has to leave at this time. SAZ says that Eric has passed his Novice examination but has not received his call as yet. WQC has a new antenna. BED is living in Cedar City but is not on the air yet. QWH is giving the DX boys a chance at a Utah contact, spending about 30 per cent of his time in the DX activity. QDM operated portable from the National Guard's Camp Williams site during the summer-camp period. MWR is trying to work DX but his results include mostly JAs, VKs, and ZLs. QDJ is having modulator trouble so has been on c.w. more than usual. Traffic: W7MWR 14, UTM 3, QWH 2.

WYOMING — SCM, Wallace J. Ritter, W7PKX — DXV is keeping things going on the YO Net on 3610 kc. in fine shape. LPP is doing lots of mobiling on a new job that keeps him traveling. YSF, SDA, TZK, and T2H assist in keeping the Pony Express Net going on week-day mornings. HDS missed on 3920 kc. while on her vacation to the West Coast. ACG/IDO are trying to decide where to operate the rig from, in their new hobby shop or in the front room. Welcome to YJG and his XYL WN7YWY, who swear their jr. operator already is saying his name in c.w. UFB is mobiling in W9-Land while on vacation. AMU recently was promoted to a full colonel in the CAP. LKQ has moved to a new location. NVI moved out of QRM and now has nothing but ducks and chickens to QRM. NVX is attending school in Chicago. IDO and WN7YWY now are members of the YLRL. IWF is getting acquainted with the boys in the eastern half of the section by holding a hamfest of their own. The Sheridan gang still is working on the new c.d. communications site while getting things rolling for the coming Annual Wyoming Hamfest in Buffalo. PMA, new EC, is learning the ropes about antennas the hard way. Your SCM again requests more news and traffic reports via the nets, cards, or letters. Traffic: W7PKX 191, MNW 27, TZK 23, PAV 3.

SOUTHEASTERN DIVISION

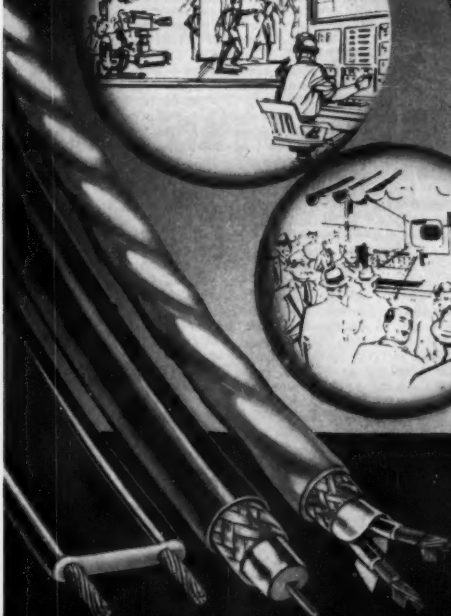
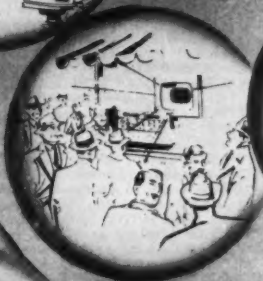
ALABAMA — SCM, Joe A. Shannon, W4MI — SEC: TKL. RM: KIX. PAM: WOG. Two-meter activity is increasing around the State with PRS and TLV DXing with super antennas and high power. Reports show that more 2-meter rigs are being built, with indications that before long we will have a section net on 2 meters. COU hopes to have medium power on 2 meters soon and will be joining the ranks. TKL met with the Cocoa Club while on a two-week visit to Florida. The Section Novice Net, which meets Mon., Wed., and Fri. at 1830 on 3720 kc., is well on its way under the guidance of EJZ. How about more Novices calling into AENA? The more the merrier. Welcome to KN4DFU, in Sheffield. A new club is being formed in Cullman with plans being made for final organization. BMM says they have five with advanced tickets and seven Novices as a nucleus. WOG made a trip to east Texas and visited with W5s JMN, WJL, KPR, and K5AEJ. HKK was voted "NCS of the month" on AENP, while ZSQ took honors as outstanding net member. CAH spent two weeks in Florida and MI and RLG attended the convention in St. Petersburg. Traffic: (May) W4COU 973, UHA 809, WOG 348, HKK 245, KIX 113, YRO 112, ZSQ 106, ZSH 56, K4ACO 48, W4EJZ 46, RLG 21, TKL 19, HYI 12, PWS 9, BMM 8, OR 7, CAH 2. (Apr.) W4YRO 77, OAO 29, PWS 10.

EASTERN FLORIDA — SCM, John W. Hollister, jr., W4FWZ — Typical of Armed Forces Day activities was that at Jacksonville. UHE, UHY, DSC, WEO, TRN, NKC, HKR, YNY and others plus help from WMBR, WPDQ, and WJHP/TV, accounted for a successful day for the special station in a downtown park. JOCO 2 was great under the direction of IM, our SEC, plus IYT, LFL, EHW, DRD, PZT, BWR, ZBA, HPT, PPH, GFF, DER, KN4CVB, KN4ARV, KN9CY/4, W8OFX/4, PPR,

(Continued on page 100)

WIRE

FOR EVERY
ELECTRONIC
PRODUCT



Belden

WIREMAKER FOR INDUSTRY
SINCE 1902

BELDEN MANUFACTURING CO. • CHICAGO

Prepare NOW

For A BETTER PAY Job

in RADIO- TV-ELECTRONICS

**GREATER KNOWLEDGE
PAVES THE WAY TO
SURE ADVANCEMENT**

Marvellous, exciting opportunities await you who
are alert—and are qualified!

**Let CLEVELAND
INSTITUTE
Help You
MOVE
AHEAD**

Success is only for those
who are prepared. CIRE
training prepares you for
advancement in Radio-TV-
Engineering. After you have
completed CIRE training,
take advantage of our
amazingly effective job
finding service that thou-
sands of men like yourself
have used to get a better

job. You owe it to yourself to prepare now for a
brighter future—send the coupon today!

**CLEVELAND INSTITUTE COURSES OFFER COM-
PLETE RADIO TECHNICAL TRAINING RANGING
FROM LOW-LEVEL TO COLLEGE-LEVEL**

A. Master Course in Radio Communication. Covers
complete Preparation for broadcast station employ-
ment including preparation for FCC Commercial
Operator License Examinations.

**B. Advanced Course in Radio Communication En-
gineering.** A College-level Radio Engineering course.

C. Specialized Television Engineering.

Mail the coupon for complete information, checking
course in which training is desired.

PAVE THE WAY FOR A BRIGHTER FUTURE

MAIL COUPON TODAY

Cleveland Institute of Radio Electronics A
QT-6, 4900 Euclid Ave., Cleveland 3, Ohio

Gentlemen:

Please send literature describing your home-study
radio-electronic courses. I desire training in course

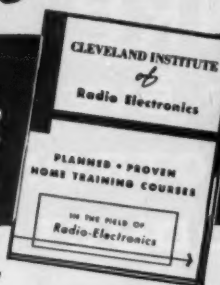
☐ A ☐ B ☐ C

Name.....

Address.....

City..... State.....

FOR PROMPT RESULTS SEND AIR MAIL



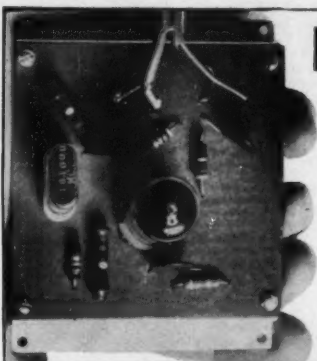
JZB, PM, and others around the lake area. The State
RACES plan is approved. State Radio Officer is UHY and
alternates are FWZ and WEO. Lake County: FE reports
he and VDY, SXJ, IQJ, and GYB, mobiles, assisted in the
Annual Watermelon Festival Parade by shaping it up via
radio. The LARA has a Heathkit DX-100. The club call
is YKY. Patrick AFB: Armed Forces Day was handled
at K4FDC by K4AZA and K4AYX over a 144-Mc. link
to the base station. Other operators at the base are IAL and
YQC. Equipment includes a BC-610, Collins 32V-2, Collins
51J2, and HRO-50. Ft. Lauderdale: JZB is on 144 Mc. with
sixteen elements, Lettine plus Techcraft. YOX runs code
classes. IM is on vacation. Lakeland: SGY on 144 Mc. has
sixteen elements, Cardwell MOPA, 3E29 final, home-rolled
converter into an AR-77, and worked KN4CVC, YZP,
and EQN. Lake City: KN4BOS uses a Globe Scout;
K4NCS is on at the USNR unit; K4BKV dropped the
"N," but KN4DHC is new. Thanks to YNM at the high
school. Miami: New DRC officers are VGT, ERK, WYR,
and QLC. Miami wants the ARRL Southeastern Division
Convention in '56. Let's help 'em do it. LVV now is
DXCCx2! Bird Sparks says the Flamingo Net again will
furnish communications for the famed Gold Coast Marathon
on July 2nd and 3rd. The Net now has 71 active. Umatilla:
AYV uses a Viking II and also is on 50 Mc. with three
elements plus 25 watts into a 2E26. Who else is on 67
Traffic: (May) K4FDC 537, W4PIU 532, WEO 172,
BWR 120, YJE 106, IM 85, TRN 84, LAP 74, ELS 71,
WS 64, LMT 49, TJU 40, YOX 40, ZIR 40, LUV 35, DSC
33, IYT 33, LFL 33, FSS 31, BZI 26, FE 19, SVB 15, TYE
12, DES 9, EHW 9, WHK 8, FWZ 5, PBS 3, WEM 2,
YNM 1. (Apr.) K4FDC 142, W4TJU 122, BWR 113, TRN
6.

WESTERN FLORIDA—SCM, Edward J. Collins,
W4MS/RE—SEC: PLE. ECs: MFY and HZ. K4AKP
makes BPL for the third month in a row. The Pensacola
Hamfest was a huge success. KN4CLJ and KN4CLK are
giving the Novice bands a workout. AXP has the big rig
perking again. The Crestview Club (CARS) reports the
following active: W4CQX, KN4BMQ, K4BNA, KN4BAQ,
K4ADM, and KN4BQY. BCG still is looking for room
for his antenna. GMS is home from college for the summer.
KN4ADY is getting married. KN4AEP is going up for
General Class. DAO/DEF is busy helping new hams. CCY
is planning a big steel tower for DX. PQW is planning all
commercial gear in the shack. PTK-TTM keep their
hand in the local nets. NOX still moves the traffic. BFD
keeps wee amn' hours. FHQ is QRL work. ACB visited the
Penay gang. UUF is the 144-Mc. DX station for the south.
SOQ has gone to LU-Land. W6UQZ is getting on locally.
EAR wants more power. HJA has the mobile gear going in
the new 12-volt system car. JPD is getting interested in
s.s.b. K4BZX is leaving us. KN4AGM is making the
hamfests. PLE and his XYL have an FB jr. operator. VR
stays loyal to 7 Mc. PAA operates on 7 and 21 Mc. UCY
is happy over 10 meters opening up. ZFL does his operating
at the PARC Club station. ZPN is teaching a code group.
GOW has renewed his ticket. MS is enjoying 5100-5180
unit on 4.0 and 14 Mc. with s.s.b. OJO, JRI, and EQR
all work in the same lab. ZFL is mobile on a bicycle. MUX
is in G-Land. RZV still is the big signal in the Dagwood Net.
K4ABN has an FB mobile set-up. OKB is working at
Sausfield Field. Traffic: K4AKP 756.

GEORGIA—SCM, George W. Parker, W4NS—SEC:
OPE. PAMs: ACH and LXE. RM: MTS and OCG.
Nets: Georgia Cracker Emergency Net meets on 3995 kc.
Sun. at 0830, Tue. and Thurs. at 1900 EST. Georgia State
Net (GSN) meets on 3590 kc. Mon. through Fri. at 1900
EST. More than 425 attended the annual Atlanta Hamfest.
YWP carried off the main prize, a Heathkit DX-100. An
organizational meeting of the Rebel Net, a state teenage
net, was held at the Hamfest. ZPS was selected NCS for
the phone section, which meets on Sat. at 10:00 on 3885
kc. EDB is NCS for the c.w. session on Sat. at 12:30 EST.
WKP presided at the meeting. YRX reports that he will
be off the air for a few weeks—he is acquiring a new XYL.
The Georgia State Net needs outlets in Columbus and
Valdosta. How about it, some of you brass pounders?
BWD is working on a mobile rig. MA is back on the air
after a slight illness. MNJ has been in the hospital at Ft.
Benning. BXV now has Vermont for his 48th state on 40-
meter c.w. with 50 watts. HAO and OPE are now mobile.
Among those from the Atlanta Area attending the South-
eastern Division Convention in St. Petersburg were ZD,
NS, OPE, WKP, MV, and TO. A new club is in the making
at Ft. Benning. Officers will be announced later. Traffic:
(May) K4WAR 2103, W4OCG 564, BVE 379, PIM 279,
DDY 228, HYV 73, CFJ 56, YTO 44, MTS 28, NS 28,
BWD 26, IMQ 24, ZD 22. (Apr.) K4WAR 718, W4ZUF
68, IMQ 36.

WEST INDIES—SCM, William Werner, KP4DJ—
AAB received OES appointment and is putting up a
6-meter beam. ACF is on 3736 kc. ABA has obtained his
General Class license. UY, transferred back to KP4 by the
Navy after a year's absence, uses Viking II and VFO. UT is
transferring to the States in August. MV's ART-13 changes
tone on c.w. Amateur emergency communications were
praised by the c.d. chief and space in the Rio Piedras
Building was offered and accepted by PRAC. At present
(Continued on page 108)

HOW TO ORDER: In order to give the fastest possible service, crystals and oscillators are sold direct. Where cash accompanies the order, International will prepay the postage; otherwise, shipment will be made C. O. D.



FO-1 PRINTED CIRCUIT OSCILLATOR

For Generating Spot Frequency Signals with Guaranteed Tolerance
1000 KC to 15,000 KC fundamental operation

Since the operating tolerance of a crystal is greatly affected by the associated operating circuit, the use of the FO-1 Oscillator in conjunction with the FX-1 Crystal will guarantee close tolerance operation. Tolerances as close as .001 percent can be obtained.

FO-1 —Oscillator Kit (less tube and crystal) \$3.95
FO-1A —Oscillator, factory wired and tested with tube (less crystal) \$6.95

FX-1 CRYSTAL Companion to the FO-1 Oscillator

The FX-1 Crystal is designed for use only with the FO-1 Oscillator. For tolerances of .01% and .005%, any FX-1 Crystal can be used with any FO-1 Oscillator.

For tolerances closer than .005% the oscillator and crystal must be purchased together. The oscillator is factory wired, and the crystal custom calibrated for the specific oscillator.



FX-1

Tolerance	1000-1499 KC	1500-1999 KC	2000-9999 KC	10,000-15,000 KC
FX-1 .01%	\$5.25	\$3.75	\$2.50	\$3.25
FX-1 .005%	\$6.00	\$4.50	\$3.00	\$4.35
(.0035% and .001% tolerances are available only by purchasing the FO-1 Oscillator and Crystal together)				
FX-1 .0035%	\$6.75*	\$5.15*	\$3.75*	\$4.75*
FX-1 .001%	\$8.00*	\$6.50*	\$5.00*	\$6.00*

*Prices are for crystal only. To insure this tolerance crystal must be purchased with oscillator factory wired and tested. For total price add \$6.95 to price of crystal desired.



ONE-DAY PROCESSING FA-9

FA-9 Spot Frequencies 1500 KC to 75 MC .01%

.01% TOLERANCE—Crystals are all of the plated, hermetically sealed type and calibrated to .01% or better of the specified frequency. See specifications below:

Holders: Metal, hermetically sealed, available in .093 dia. pins (FA-9) or .050 dia. pins (FA-8). Calibration Tolerance: $\pm .01\%$ of nominal at 30° C.

Temperature Range: -40° C to +70° C.

Tolerance over temperature range from frequency at 30° C $\pm .01\%$.

Circuit: Designed to operate into a load capacitance of 32 mfd on the fundamental between 2000 KC and 15 MC. Designed to operate at anti-resonance on overtone modes into a grid circuit without additional capacitance load. Write for recommended circuits.

Orders for less than five crystals will be processed and shipped in one working day.

PRICES FA-9* (Pin Diameter .093)*

Pin Spacing .486 (*FA-9 fits same socket as FT-243)

RANGE	TOLERANCE	PRICE
Fundamental Crystals		
1500-1799 KC	.01%	\$4.50
1800-1999 KC	.01%	\$3.90
2000-9999 KC	.01%	\$3.80
10000-15000 KC	.01%	\$3.90
Overtone Crystals		
(for 3rd overtone operation)		
15 MC—29.99 MC	.01%	\$2.80
30 MC—54 MC	.01%	\$3.90
(for 5th overtone operation)		
55 MC—75 MC	.01%	\$4.50

For Commercial Use F-6 Series 1000KC to 60MC

Wire mounted, plated crystals, for use in commercial equipment where close tolerances must be observed. All units are calibrated for the specific load presented by equipment.

Holders: Metal, hermetically sealed.

Calibration Tolerance: $\pm .0025\%$ of nominal at 30° C.

Tolerance over Temp. $\pm .005\%$ from -55° to +90° C.

Range: $\pm .002\%$ from -30° C to +60° C.

Send for FREE Catalog covering International's complete line. Crystals available from 100 KC to 100 MC.

Circuit: As specified by customer. Crystals are available for all major two-way equipments. In most cases the necessary correlation data is on file.

Drive Level: Maximum—10 milliwatts for fundamental, 5 milliwatts for overtone.

F-605

Pin dia. .050
Pin length .324

F-609

Pin dia. .085
Pin length .445

F-612

Pin dia. .125
Pin length .820

Pin spacing on each of above is .486

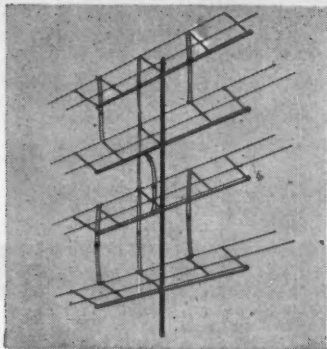
ONE DAY SERVICE



F-605

International CRYSTAL Mfg. Co., Inc. 18 N. Lee Phone FO 5-1165
OKLAHOMA CITY, OKLA.

HIGHEST GAIN Antennas For VHF Operators LOWEST COST



32 ELEMENTS 100 POWER GAIN*

This will make your 10 watt look like a Kilowatt at the receiving end.

8 element beam	\$12.50
16 element beam	21.50
32 element beam	37.50

All prices F.O.B., Racine, Wis.

IN KIT FORM TO
SAVE YOU MONEY

EASY TO ASSEMBLE
COMPLETE INSTRUCTIONS

WRITE NOW FOR FULL DETAILS

* 20 DB Forward Gain
Telephone 3-9472

Serving the High Frequency
Operator

U. H. F. RESONATOR CO.
224 - 7th St.
RACINE, WISCONSIN

a TBS-50 is installed and operating on 3925 kc. AAC and AAO are using a.s.b. ES has a five-element Telrex beam on 20 meters. The Antilles Net now receives weather from Aruba PJ2AO. ACB, located on top of a mountain near Castañer, uses emergency power at all times and reports weather to the Antilles Net for the USWB. DH is trying 'phone since he obtained a Viking II. DV uses an electronic T-R switch for break-in. NY is leaving KP4 for another church assignment in the States. CO suggests a hidden transmitter hunt. HZ, MV, CN, and QA appeared on a 30-minute TV show explaining amateur radio. KD and his son BJ attended the Southeastern Division Convention in St. Petersburg, Fla. WT reminds us that she guards 3925 kc. all day from 7 A.M. to 10 P.M. RK/mobile had a 'phone patch with his father through MV from Mayaguez to San Juan. AZ is putting up a 40-ft. vertical. QR is practicing with a Mon-Key. Traffic: KP4WT 140, DJ 2.

CANAL ZONE — SCM, Roger M. Howe, KZ5RM — Acting SCM: P. A. White, KZ5WA. W4UEL and W4DIR came down from Miami to listen to Stateside QRM and visit friends on this end of the QSOs for a change. KZ5BD and DW gave a party for club members at their home after the CZARA meeting in May. KZ5, "Very Romantic" (Virginia) is now on the air. She conducted a very fine code class for CZARA for the last 12 months. The theory class, held the same period, was conducted by KZ5s GD, BD, RM, and FL. RM (also W9OYA), our SCM, is now visiting Stateside and will see W9PNF, ex-KZ5WJ, GD and DG, also in the States, are operating as W0WXL/mobile and W0DLU/mobile. WZ has a new a.s.b. rig on order for 20-meter operation. Three cubical quads were used for 10, 15, and 20 meters under the Field Day club call KZ5KZ, at Gamboa, on June 18th and 19th. Field Day plans were in the hands of RV and CF. Traffic: KZ5WA 153, KA 50, HA 45, VR 16, JJ 15, VZ 9.

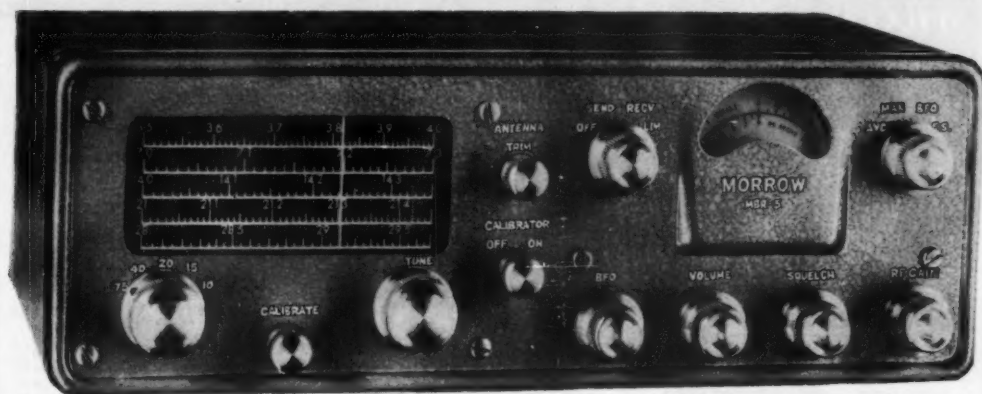
SOUTHWESTERN DIVISION

LOS ANGELES — SCM, William J. Schuch, W6CMN — SEC: QJW. RMs: BHG, GJP, and K6DQA. PAMs: PIB and YVJ. The Eagle Rock Teen Age Club is now an affiliated club and the club call is K6LBZ. BES now has a full gallon and a 7-Mc. beam. CBO is putting up a V-32 antenna. K6BFC worked ZD6BX on 7 Mc. with his new 500 watts. BUK has a tower now and an Elmac receiver for the car. New members of the Pacific Club are K6GCN, BFC, CEO, and W6UED. K6EJT is QRL traffic and makes BPL. Congrats. HIF checked into SCN from Portland, Ore. NJU finally made it into Europe, 7 countries in two nights. FB, WT is having fun on 144 Mc. KN6JRY sports a new Harvey Wells. K6EXV is corr. secy. for the L.A. YLRL. KN6KDJ has moved to Washington. K6DQA, W6USY, CMN, GJP, and GYH, all of SCN, attended the Convention in Fresno and all report a swell time. The June '55 *Ford Times* has a nice blurb for ham radio. Among the new Novices in the section are KN6LHA and LML. Congrats. New officers of the San Fernando Valley Radio Club are YSK, pres.; K6ARM, vice-pres.; K6BAU, secy.; K6ELA, trns.; K6KXT, membership; W6UEL, program; and K6EVT, refreshment. FKZ has GP antennas on 7, 14, and 21 Mc. K6JHR has new SX-99 and Viking Adventurer and has just put up a 7-Mc. GP. K6BFC finally is back on the air and also has a new 21-Mc. beam. KZ2BE paid a visit to the shack of GYH. ORS won a Communicator at the Fresno Convention. CMN has new twin Yagi 5 on 144 Mc. BHG is QRL with traffic skeds and OBS duties. K6DQA is the new manager of the Southern California Net. Don't forget the San Diego Convention, Oct. 1-2. It is with regret that we report the passing of Harold F. Wood, QVV, June 7, 1955. Traffic: (May) K6EJT 530, W6USY 284, GYH 279, K6DQA 153, W6BHG 146, WPF 129, CMN 122, CAK 104, CK 64, KN6HOV 59, K6COP 51, BWD 23, W6YVJ 23, HIF 19, GJP 14, WT 12, ORS 11, K6ELX 10, BEQ 8, W6CBO 8, NJU 2, EUD 1. (Apr.) K6BFC 136.

ARIZONA — SCM, Albert H. Steinbrecher, W7LVR — Asst. SCMs: Kenneth P. Cole, 7QZH, and Dr. John A. Stewart, 78X. SEC: VRB. PAM: KOY. The Arizona 'Phone Net meets Tue. and Thurs. at 7 P.M. MST on 3865 kc.; the Arizona C.W. Net Tue. and Thurs. at 8 P.M. MST on 3690 kc. The outstanding event of the month of May was the Annual Montezuma Well Hamfest, which was bigger and better this year than in all previous years. There were approximately 275 persons present, representing 75 calls and 48 mobile installations. Those who attended were W7s BFA, DJH, DRQ, EAW, HGJ, HYQ, JKY, KAD, KAE, KCB, KOF, KOY, KUJ, KWB, KXT, LEE, LUN, LSK, LXX, MAE, MDD, MES, MWQ, NAP, NEL, NTK, NUL, NYN, OAS, OIF, OPY, OQS, OUE, PAC, PJY, PMQ, PZ, QHD, QWI, RFE, RIJ, SIP, SNI, SX, TJT, TLY, TNY, TPL, UBT, UCA, UDI, UPQ, USM, UXK, UXZ, VKO, VXM, WKM, WNN, WUX, WYY, YFG, YLR, W5s BQU, MTO, W6s DFL, EAI, EL, EWW, EXB, IZS, PIB, W9ANA, W9UEN, and VE3DVD. We regret to announce the passing on May 29th of JFG, Nap Trembley, of Tucson who was professor of French at the University of Arizona. WUG made BPL with 154 originated messages. LVR received his Maritime Mobile certificate. The Ft. Huachuca ARC's hamfest plans are complete for Sept. 3-4-5. 4CMC

(Continued on page 104)

New MORROW Receiver



COMING SOON!

The NEW MORROW MB-560 MOBILE TRANSMITTER designed to match the NEW MORROW MBR-5 MOBILE RECEIVER. 5 bands—VFO—60 Watts. Modern compact design. 4 inches high x 11 $\frac{1}{4}$ inches long x 6 $\frac{1}{2}$ inches deep. SEE IT IN QST NEXT MONTH!

Now MORROW engineers have teamed up to bring amateurs a superb new mobile receiver, the MBR-5. The MBR-5 is a complete 13-tube dual conversion superheterodyne communications receiver built to afford greater versatility, easier installation and added operating convenience. All the fine workmanship and dependability of Morrow engineering and manufacturing processes are built-in in this new receiver to offer better performance and more value than anything offered to amateurs before. Compare MORROW specifications! SWITCH TO MORROW TODAY!

HIGH SENSITIVITY—Better than $\frac{1}{2}$ microvolt sensitivity assures hearing practically any signal. This feature combined with excellent signal/noise ratio makes signals readable that are ordinarily lost.

100 K.C. CRYSTAL CALIBRATOR—Now, for the first time, MORROW has made it possible for amateurs to read exact frequency on mobile receivers. Assures high reset accuracy.

SSB AND CW RECEPTION—Excellent SSB and CW reception is assured due to the inherent stability of the MBR-5. No warm-up delay. Fully temperature and voltage compensated oscillators. Will hold calibration accuracy with changes of 0 to 150 degrees F. and input voltages of 4 to 8 volts, DC.

ECONOMY PRICED—\$224.50 complete with 6-12 volt DC power supply, MORROW SH type PM speaker, operating instructions and mounting hardware. Physical size: 4 inches high, x 11 $\frac{1}{4}$ inches long, x 6 $\frac{1}{2}$ inches deep. PW-115, for fixed station use: \$29.95.

SQUELCH AND NOISE LIMITER—The exclusive new MORROW Noise Balance Squelch completely eliminates interstation noise but will readily open on weakest signals. The improved series gate noise limiter is extremely effective in eliminating pulse noises.

ILLUMINATED "S" METER—Measures incoming signal strength and used as a field strength meter for adjusting mobile transmitters to maximum output. A must for mobile amateurs.

NO SPURIOUS RESPONSE—Excellent RF design eliminates images and spurious responses. Bothersome broadcast break-through and oscillator harmonics suppressed.

HOME STATION OR ANY AUTO—Power supply operates on both 6 and 12 volts. 120 volt AC power pack available for fixed station operation. Accessory socket on power pack to supply low voltage stages of the MORROW MB-560 Mobile transmitter.

TUBE LINE-UP: 6BZ6 RF—12AT7 mixer, osc.—6BJ6 IF—6BE6 mixer, crystal osc.—6BJ6 IF—6T8 det., BFO—6AL5 noise rect.—6AL5 noise limiter—12AX7 audio amp., squelch—6C4 audio amp.—6AQ5 audio output—6BJ6 crystal calib.—12AT7 noise amp., "S" meter.



Canadian Office: 801 Dominion Bldg.
Vancouver, B.C., Canada

the NEW LOOK in BUD PRODUCTS and new sizes, too!

If you take pride in the appearance of your rig, get acquainted with the new look in Bud Products and the new sizes of some of our items.



SLOPING PANEL CABINETS

Now Bud offers 4 new sizes in our Sloping Panel Cabinets. With 9 sizes now in this line, there is sure to be a size to fit your need. In addition, there are quality bonuses like the exclusive Bud hinged top providing easy access to components . . . and there's more — you can have light grey hammered finish at no extra cost.

TELEPHONE TYPE RELAY RACKS



Four sizes of these sturdy racks are now available for your convenience instead of two sizes previously offered. Now all standard relay racks may be obtained in light grey hammered finish without extra charge.

The following Bud products are also available in light grey hammered finish:

- DESK TYPE RELAY RACKS
- METER CASES (Steel and Aluminum)
- METAL UTILITY CABINETS (Steel and Aluminum)
- CARRYING CASES (Steel and Aluminum)

See these and other fine Bud products at your distributors. If your local distributor does not have these items in stock, send us his name and we'll see you are supplied immediately.



BUD RADIO, Inc.

Dept. Q
Cleveland 3, Ohio

2118 East 55th St.

says overnight camping facilities can be had at Garden Canyon, also there are motels; civilian planes can use the Army air strip if Army is released from responsibility. Traffic: (May) W7LVR 46, WUG 17. (Apr.) W7WUG 182.

SAN DIEGO — SCM, Don Stansifer, W6LRU — The big news of the month is the coming Southwestern Division Convention, sponsored by the San Diego Council of Clubs, on Sept. 30th, Oct. 1st, and Oct. 2nd. The officers of the Council are ODR, chairman; GGB, vice-chairman; SEG, secy.; and BPK, treas. WYA is chairman for the Convention. CRT has added 10 new countries recently, including VS6, YO, SM, KG1, OE, KC6, SP, VP4, PA, and Trieste. KN6LIR is a newcomer to Pt. Loma. OME, ex-1A3AA, is home again, and working DX with his kw. rig. New officers of the YLRL are: Mary Poe, pres.; Kathleen Kreyser, vice-pres.; Isabell McKenney, secy.; Billie MacDonald, treas. HIL has a new 75A-4. K6LKW now is living in Vista. KVB is mobile in his new Ford on 75 meters. HAW is mobile all bands and anticipating a trip to Iowa. HTN is angling for a Johnson KW rig. The Palomar Club has been released its old call, NWG, and used it during Field Day. K6AWW is now in Carlsbad. BZE and KSM are building new all-band finals. CHV and LRU were among the first 5 W6s who worked VS4CT when he started operating from Sarawak on 20-meter 'phone. CHV also worked him from Brunei. The local DX gang is very active again with improved conditions. LRU is now at 199 countries, with HK8AI, YJ1DL, VS4CT, and ZD6BX. ODR and his XYL flew to England for a vacation in June. It is hoped that the entire gang will pitch in and make the coming Division Convention as successful as those in the past have been. SYA has a new twin-five beam on 144 Mc. Traffic: W6IAB 3257, YDK 825, IZG 262, K6DBG 44, W6FMZ 7, KVB 6.

SANTA BARBARA — SCM, William B. Farwell, W6QIW — Santa Barbara AREC is well organized and conducts c.d. drills on regular skeds. Our hats are off to Ventura and Oxnard AREC for their FB c.d. work, also. K6BVZ and W6FFF are on 6 meters. TMI has worked over 45 states on 6 meters. K6KXB now is General Class. BQP is rebuilding. PKC, IHD, ZRR, and QHC are on s.a.b. The mortality rate of Novices is only 3 per cent in this section. Code classes are conducted by the Santa Barbara, Ventura, and Oxnard Clubs. K6KPU and W6SRI check in regularly on ALN. ENR is mobile with a Viking Ranger. QIW, MSW, IGH, and ENR were among those attending the Pacific Division Convention at Fresno. The Tri-County Net, on 3820 kc. at high noon is very active. PQJ holds skeds with his son in college. ENR and NKT are very active OOs. State College hams active on 3995 kc. are K6AVC, ALP, W6BIN, SLR, and EJO. Traffic: K6NBI 387, W6REF/6 80, QIW 70, K6KPU 6, W6FYW 4, K6ASB 3, W6Dty 2, ENR 2, SRI 2.

WEST GULF DIVISION

NORTHERN TEXAS — SCM, T. Bruce Craig, W5JQD — SEC: RRM, PAMs: PAK and IWQ, RMs: PCN and QHI. The Midland Amateur Radio Club has been accepted as an ARRL affiliate. ACK is mobile with 12 watts. AHC is rebuilding his rig. HKF has moved to Brownfield, leaving an opening for EC in Seagraves. MBP reports for the Blue Ridge 160-meter Net, which held a picnic at Lake Lavon on Apr. 24th with 32 present. The Net meets on 1890 kc. at 0800 each Sun. with 86 per cent attendance for May. CZZ, DBE, DNZ, LVP, MBI, MBP, QFK, and GES have mobiles on 160 meters. LGY reports that she is on 40-meter 'phone and c.w., that HDM went to work for WFAA at Grapevine, and that AFY has a new daughter. WXY is president of the Texas YL Round-up Net; W5SYL, vice-pres.; LGY, secy.-treas.; ZPD, pub. chairman. APK is a new member of NTEN. FIR is putting up a new vertical on 75 meters. The Temple Amateur Radio Club was alerted and assembled at the Police Station on a stand-by basis on May 6th at 1815 hours after a tornado wind demolished a part of the city. The amateurs furnished the power units used at the scene of the disaster until relieved by the National Guard. Stations participating were VIF, SBS, CHF, JIB, WDW, PNP, UPO, VHF, DXD, and numerous other fixed stations as well as some of the XYLs. Fort Worth hams were guests of the Southwestern Bell Telephone Co. on Apr. 21st for a tour of the exchange office. ONQ has code classes going; he operates on 40 meters because of difficulty in antenna length. Traffic: K5FFB 2052, W5DTA/5 999, KP6 523, FJB 298, UBW 156, AHC 149, PAK 127, ACK 81, PCN 54, CF 50, FCX 27, ASA 16, LGY 10, HKF 8.

OKLAHOMA — SCM, Dr. Will G. Crandall, W5RST — Asst. SCM: Ewing Canady, 5GIQ, SEC: KY, RM: GVS. PAMs: PML, SVR, and ROZ. The most notable event of the month was the North Fork Hamfest at Quarts Mountain State Park. West Gulf Division Director CF gave a fine talk and enjoyed himself. He won over RST as the oldest ham present. BIE was not satisfied with climbing roofs daily putting up TV aerials but had to climb the mountain with the kids. Sorry to report that the change in the license plate law did not pass as it started too late and got lost in the shuffle in the closing days of the session. Amateur radio again demonstrated its readiness to serve in an emergency when a tornado hit Blackwell. The tornado warning net had been following the squall line from Southwest Oklahoma

(Continued on page 108)

HARVEY ALWAYS HAS IT...IN STOCK For IMMEDIATE DELIVERY

Write for HARVEY's
**1955
HAM CATALOG**
IT'S FREE!



ELDICO FS-100 100 KC Frequency Standard

Transistor-operated, contains its own battery. No larger than a pack of cigarettes. No external connections for normal use. Gives accurate frequency markers at every kc on receiver dial. **\$1895**

GONSET COMMUNICATOR Transmitter-Receiver with Dual Power Supply

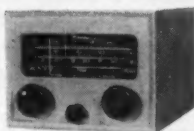
Model	Band	Power Source	
		VDC or VAC	
3025	2-meter	6	110
3037	2-meter	12	110
3049	6-meter	6	110
3058	12-meter	12	110

Complete with tubes
(less crystal and mike)
each **\$22950**



MORROW 5BR-1

5-Band
Converter
\$7495



ELMAC AF-67



Trans-
Citer
\$17700



PALCO BANTAM 65 MOBILE TRANSMITTER

Small, 2-chassis construction • 65 watt phone, 90 watts CW • 80 thru 10 meters with bandswitching • TVI-suppression • VOX • Gang-tuned VFO and exciter
Complete with RF unit, speech amplifier and modulator (with tubes and connectors) **\$15950**

MASTER Mobile Antenna and Coils

Operates as 10 meter antenna when used without coils. When used with coils permits operation on all bands. Two sections come apart easily for inserting and changing loading coil. Each coil is retuned to an extremely high Q.

Antenna (less coil)	\$6.86
75 meter coil	6.81
40 meter coil	6.81
20 meter coil	6.81



Model 73-E

STEWART WARNER Portafone Citizens 2-Way Radio

A lightweight, self-contained radio receiver and transmitter. Has a transmitting and receiving range from several hundred yards to several miles, depending upon terrain. The perfect communication system for the construction engineer, the surveyor, the TV service technician, and the many others in the need of inexpensive means for short range communication. Portafone weighs only 28 ounces and fits comfortably into the hand. Power is obtained from either battery or AC supplies. One Battery or Power Pack is required for each Portafone unit.

Portafone Model 73-E, per unit, including antenna and carrying case (less battery or power pack) **\$12995**

Add Fed. Excise Tax **3.50**

Handy Battery Pack for portable use **6.45**

Central Station Power Pack for 115 v. AC **34.65**

6 and 12 volt DC Power Packs (specify 6 or 12 volts) each **31.00**



ELMAC Mobile Receiver



Dual
Conversion—
10
Tubes

Model PMR-6A for 6 volts
Model PMR-12A for 12 volts

Complete with tubes (less power supply) each **\$13450**

POWER SUPPLY 6 or 12 volts **\$24.50**

GONSET Super 6

6-Band
Converter



10- thru 75-meter phone bands plus 49- and 19-meter shortwave broadcast bands. Has panel-controlled antenna trimmer.

Complete with tubes **\$5250**

SHAKESPEARE

Fiberglass
WONDEROD
Whip Antenna

90 inches **\$695**

TECRAFT Crystal-Controlled CONVERTERS

For 2—6—10—11—15 meters
or CAP Channel 7

Any Model — any IF **\$2975**

Complete Kit **42.50**

Factory Wired **42.50**

**New HARVEY
TimePayment Plan**
ON PURCHASES OF \$150 OR MORE.
UP TO 12 MONTHS TO PAY
Write For Details

**We're Generous
On Trade-Ins**
If You Want To Talk
SWAPS AND DEALS
write ... or call W2DIO

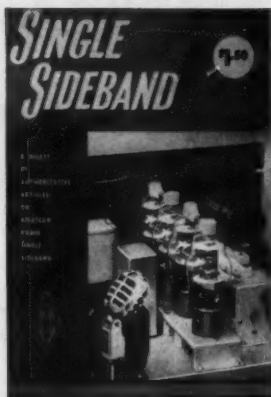
NOTE: Prices Net, F.O.B., N. Y. C.
Subject to change without notice

HARVEY is known the world over... wherever Hams operate... as a reliable source for Ham Equipment... assuring fast service and prompt deliveries.



Harvey RADIO CO., INC.

103 W. 43rd St., New York 36, N. Y. • JUDSON 2-1500
Established 1927



Single sideband is here to stay and it behooves us all to learn about this modern and revolutionary form of transmission. Whether or not you're already using SSB, you'll find much useful information on both transmitting and receiving techniques in "Single Sideband for the Radio Amateur." The work of more than twenty-five authors is collected between two covers for convenient reference. Keep up with the game, get your copy now!

\$1.50 POSTPAID

The AMERICAN RADIO RELAY LEAGUE, Inc.

WEST HARTFORD 7 • CONN.

for several hours with several funnels sighted and many communities alerted. Luckily HFV's QTH was not hit and power was still on so help was on the way in short order. EC LWJ was in Tulsa but got over the next a.m. with emergency gear and handled many messages, most of which were welfare. Others in there soon were GIQ, MFX, 9PHR, and CXM, who spent many hours helping with the traffic. Traffic: (May) W5GVS 410, IWJ 220, LX 156, PML 96, MFX 73, SVR 70, QAC 61, KY 58, PNG 56, FEC 44, JXM 38, RST 38, CBY 34, HCG 33, TNW 33, ADC 31, FU 19, CXM 18, MQI 17, MGK 14, CFG 13, UCT 12, GXH 11, CYQ 10, EHC 10, PAA 7, TKC 4.

SOUTHERN TEXAS — SCM, Morley Bartholomew, W5QDX — Members and guests of the South Texas Emergency Net met at Kerrville May 27-29 for their tenth annual convention. General chairman BEO and all the Kerrville gang really put on a swell show. New Net officers are CWS, nc; RKI, alt. nc; LRK, secy.-treas.; JHW, pro. Zone 1: EV, ac; ONG and TVK, alt. ac; MSA, pro. Zone 2: RWS, ac; WYK, alt. ac; AUM, pro. Zone 3: EJT, ac; WXT and DKK, alt. ac; WIS, pro. Zone 4: AUO, ac; NZH and CRA, alt. ac; SZB, pro. Zone 5: SJL, ac. The C.W. Net is headed by FIW, nc; MJN, alt. nc. EV, NSA, TEL, QKF, QEM, and LMU were seen greeting old friends at the convention. The Red Cross at Mission held a simulated disaster on March 6th. Valley amateurs who participated were PBD, base station, FZO, SZB, PBU, NZH, AUO, PAR, LKJ, AET, NVQ, TVL, ASI, DNX/5, and K5NCJ. The Rio Grande ARC has started code classes. YRI has moved to Donna and has a new Globe King. BVZ and BWT are on 75 meters. The CCARC furnished communications for the Padre Island Walkathon, the 110-mile contest from Pt. Isabel to Corpus Christi. Everyone got lots of experience in message-handling. AQK, HQR, and PMT spent three nights on the Island with the walkers, and all club members worked shifts at the Corpus Christi end to get the messages through. The Club also furnished communications for the Buccaneer Day Celebration. The Austin Naval Reserve Unit is starting code and theory classes for beginners. PRO is operating portable from Rockdale this summer. Traffic: (May) W5MN 381, TFF 34, (Apr.) W5TFY 12.

NEW MEXICO — SCM, Einar H. Mortenrud, W5FPB — SEC: KCW, PAM; BIW, V.H.F. PAM; FFB. The NMEPN meets on 3838 kc. Tue and Thurs. at 1800 MST, Sun. at 0730; the NM Breakfast Club every morning except Sun. 0700-0830 MST on 3838 kc; the NM C.W. Net daily at 1900 MST on 3633 kc. We regret to announce that GYN has joined Silent Keys. New officers of the Pecos Valley Radio Club are ZU, pres.; ARD, vice-pres.; DZB, secy.-treas.; COS, act. mgr. The Albuquerque V.H.F.-U.H.F. Radio Club has been organized with the following officers: FAG, pres.; VWU, vice-pres.; FJE, secy.-treas.; ECS, act. mgr. The Club has been holding drills with c.d. message center personnel. CEE is the new State MARS Director. CZT has a Gonset Communicator II. QHB is on 2 meters from Los Alamos. The following furnished communications for the auto races held at Fort Sumner: KN5ADS, W5CZT, FVY, GXU, JAU, LEF, NSN, OAL, PDY, PKL, UAF, UCX, UWA, and VDY. The Navy has called UEO to sea duty. A total of 203 registered at the State Hamfest held in Albuquerque sponsored by the Amateur Radio Caravan Club. John Reinartz, K6BJ, was speaker. The prize-winning prize, a complete mobile station, was won by 9WFR; registration prize, an SX-99, was won by W5KNU. K5WSP and K5FEF made BPL in May. Traffic: K5WSP 1222, FEF 351, W5RFF 131, QR 18, ZU 18, BZB 16, JZT 13, UAR 7, HOE 4.

CANADIAN DIVISION

MARITIME — SCM, Douglas C. Johnson, VE1OM — Asst. SCMs: Frits A. Webb, 1DB; Aaron D. Solomon, 1OC. SEC: RR. New appointees are AEB as OPS, AAY as ORS and OPS, and QZ as OES. JT is active from Grand Manan. Joe is ex-VE2ANR. BN and W3TWO/VOI were recent visitors to Halifax. W4SIY/VE1 is active from Shelburne. Hats off to those amateurs who monitored 75 meters, and were well-prepared for any eventuality during the recent bad outbreak of forest fires. WB, NBARA president, reports two successful c.d. exercises in which N.B. hams took part. Apparently civil officials of Fredericton were very impressed. Mobiles VO1T, AE, B, AO, 2I, W9WIA, W4WOU, and W6MTZ participated in the Cancer Drive canvas. VO1AB was control station. The recent hidden transmitter hunt was won by mobile VO1AE. Others taking part were W4WOU and VO1s T, AO, B, and AB. VO1D/2 was the hidden transmitter call. The Newfoundland Radio Club executives are VO1AO, pres.; W6CZK, vice-pres.; W5RPI, trans.; VO1D, reflected secy. W7SNR/VO6 reports a posting to KH6-Land. VO6AM, the XYL of VO6U, is a new ham in Goose. Ex-W4KVM/VO6 is now KG1JB in Greenland. VO6AB is active on 20- and 75-meter 'phone. VO6U has worked 124 countries to date. Traffic: (May) VE1FQ 85, VO6B 146, VO6AH 96, VO6U 81, VE1AV 49, OC 47, DW 43, UT 40, VO6AM 15, VO1D 12, VE1OM 10, AEB 9, VO1T 8, VE1GA 7, DB 2, ABZ 1, WB 1, WK 1. (Apr.) VE1WK 6.

ONTARIO — SCM, G. Eric Farquhar, VE3IA — We record with regret two Silent Keys. Grant Salla, an ardent

(Continued on page 108)

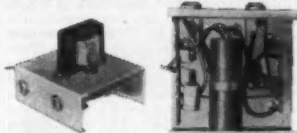


Leo E. Meyerson
W2GFG

1st... by Experience!

BEST BY TEST!

WRL's NEW Economy Code Oscillator Kit



Top-Side and Bottom View, Wired
Build this low-cost, code oscillator!
Helps you learn code faster; prepare
for your novice license. All parts
and simplified wiring instructions in-
cluded. Then plug into any 110 volt AC
source, and with accessories below,
you're ready to go.

Cash Price **\$4.95**
Only

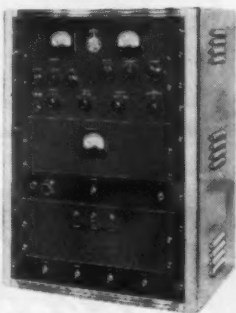
ACCESSORIES

J-38 Key (XA883) \$.99
Headphones (50A005) 2.01
Phone Plugs (1A025) .33
Order by catalog number

NOW READY! — THE NEW & IMPROVED

Completely Bandswitching 500-A GLOBE KING

Here's an advanced design, high power transmitter of 500 watts input on both CW and fone 100% modulated. Is completely bandswitching 10 thru 160M. bands. Consists of RF, Speech Modulator and Dual Power Supply Sections. Entire unit is specially screened for TVI. Pi Network output matches any antenna from 52-600 ohms. Has provisions for VFO and Single Sideband input. Forced air-cooled 4-250A tube, push-to-talk, special aluminum mesh screening of RF Section — just a few of the many fine features. Enclosed in grey hammertone cabinet, 31"x 21 1/4"x15".



ONLY \$3678 per mo.

\$67.50 DOWN
CASH PRICE: \$675.00

LATEST RECONDITIONED EQUIPMENT

Save up to 50%. All reconditioned equipment carries a 90 day, factory-new guarantee on parts and workmanship. Send for our latest, complete list today!

BEST BUY IN BEAMS!

WRL's new line of sturdy "Plumber's Delight" beams. 1 1/4" hot dipped galvanized steel boom; all elements aluminum; 1 1/4" center pieces; 1" end inserts. Wooden doweled at all stress points. 20M beam has double 1 1/4" hot dipped galvanized steel booms for extra sturdiness. Specify choice of T or Gamma Match. All beams three element.

10M \$18.95 15M \$27.95 20M \$49.95

JUST OUT! — THE NEW & IMPROVED

65-A GLOBE SCOUT

Completely Bandswitching

This excellent Xmtr. offers 65 watts input on CW. 50 watts on fone. Is completely bandswitching 10 thru 160M. Combination Pi Network antenna tuner. 100% modulation of Final. Housed in 8" x 16" x 8" grey cabinet.

Wired Form **ONLY \$7.95**
Just \$10.00 Down per mo.



KIT \$89.95 CASH
WIRED \$99.95 CASH

The New 1956 Catalog! Your Guide . . .

to over 15,000 of the latest items for the amateur, the experimenter, the industrialist and the H-FI fan. Makes it easy to do business with WRL.



☐ Please send me your latest FREE Catalog. I would also like full information on the items checked below! Quote your top-trade-in offer.

ALL PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

WORLD'S MOST PERSONALIZED RADIO SUPPLY HOUSE



3415 W BROADWAY, CO. BLUFFS, IA. Phone 2-0277

for my _____
(Name and Make of Equipment)

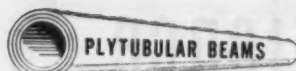
on your _____
(New Equipment Desired)

- ☐ Globe King 500-A ☐ Globe Scout 65-A
☐ WRL Beams ☐ Latest Reconditioned Eqpt.
☐ Code Oscillator Kit

Name _____

Address _____

City and State _____



PLYTUBULAR BEAMS

THE GREATEST ADVANCE IN ROTARY BEAM DESIGN OF THE PAST 20 YEARS.

- LESS VIBRATION
- LESS WEIGHT
- LESS ICE LOADING
- LESS WIND DRAG

ALSO TENNAKITS FOR BUILDING
YOUR OWN HIGH QUALITY BEAM

See your distributor or write

TENNALAB-QUINCY, ILLINOIS

**ALL TRUE
AND
STRONGER
TOO!**

A Paying Proposition!

Maintenance of commercial mobile-
radio installations is big business...
still growing fast... pays good money
...and regularly!

It's a natural for hams!

**HERE ARE THE TEST INSTRUMENTS
PREFERRED BY EXPERIENCED ENGINEERS:**



**LAMPKIN 105-B MICROMETER
FREQUENCY METER**

Meterdyne type. Range
0.1 to 500 MC., all chan-
nels. Pinpoint VHF CW
signal source. Weight 13
lbs. Width 13". Price
\$220.00 net.



**LAMPKIN 205-A
FM MODULATION METER**

Measures FM voice deviation,
±25 KC. Tunes 25-
500 MC. in one band.
Speaker. Oscilloscope out-
put. Weight 13 lbs. Width
12". Price \$240.00 net.

Both instruments meet FCC mobile specs...
are easy-to-carry... but rugged and accurate.

You can build your radio knowledge
into a profitable business, full- or
part-time! How? ... ask for booklet
"How to Make Money in Mobile-Radio
Maintenance". No charge... Act Now!



LAMPKIN LABORATORIES, INC.
Mfg. DIVISION, BRADENTON, FLA.

At no obligation to me, please send

☐ Free booklet ☐ Technical data on Lampkin meters

Name

Address

City State

LAMPKIN LABORATORIES, INC.
Mfg. Division
BRADENTON, FLORIDA

SWL of Nortown Club, Toronto, was killed in a motorcycle accident and Bob Hare, VE3CRH, was killed in a bicycle accident near Smith Falls. The latter did much valuable work during the past two winters as a member of the St. John Ambulance Ski Patrol in Ottawa. Deepest sympathy is extended to both families and the Nortown and Ottawa radio clubs. On the loss of his mother we also offer our condolences to BNQ, of Hamilton. DTO is Class A. Two members of Nortown were recognized for splendid showings in the last Sweepstakes. DRD won the Captain Morgan Trophy for c.w. operation and BVI the Albert Bickerton Cup for 'phone. AOE is rebuilding. ATR is greatly missed in traffic circles and the gang is pulling for Reub in the hopes of improved health. AJR reports a fine time at the Oshawa Banquet. The Roblin Amateur Radio Club of Toronto is a recent ARRL affiliated club. New officers of the Ottawa Club are BCU, pres.; CMW, vice-pres.; AXL, secy. CCO is heard on 50 Mc. AYE, formerly G3AAU, is heard on 14 Mc. BMH, a newcomer, is welcomed. DWG, in Brussels, Ontario, sends in his first traffic count. Traffic: VE3BUR 238, VZ 153, GI 132, AJR 121, KM 101, NG 79, TM 76, NO 49, AUU 47, DWG 40, PH 14, VD 2.

QUEBEC — SCM, Gordon A. Lynn, VE2GL — AIL has a Lettine 240 with an 8-40A receiver on all bands from Iberville. AVZ is a YL newcomer at Victoriaville. PV experiments with the radio control of miniature boats. ZI has changed QTH to Cap de la Madeleine. AND keeps LaTuque on the air. EC continues his siteds and handles considerable traffic: The new c.w. slow-speed net on 3710 kc. operates Fri. at 1900 EDT. AEV now is mobile on 75 meters. Congrats to ABS on his marriage May 21st. ACP is changing his QTH to Ottawa. ADD is Asst. EC for Amos. ATT is the new publicity manager of the South Shore Amateur Radio Club. The McGill Radio Club has had a good year with the club station, UN, with ACK as president. The new officers are SC, pres.; LS, vice-pres.; AQL, treas.; and AIY, secy. LS is summer relief operator at a TV transmitter station and is using a new mobile rig. AQL has moved to Chambly. SC is at a 50-kc. broadcast station for the summer and is building a DSRC rig using a pair of 304THs. AUU is sold on ¼-wave ground-plane antennas. PQN has reduced sked to Mon., Wed., and Fri. for the summer months. ASU is an excellent c.w. operator although still in high school. Traffic: (May) VE2DR 102, EC 30, ATC 26, FL 9, GL 7. (Apr.) VE2DR 112, II 66, EC 39, ATC 14, FL 11.

ALBERTA — SCM, Sydney T. Jones, VE6MJ — PAM: OD, RM: XG. The Lethbridge and Coaldale amateurs did a fine job in keeping communications open recently when heavy wet snow knocked out telephone lines. The Coaldale end was handled by AM, TS, CK, VH, and HF, and the Lethbridge end by DY, OF, TG, OS, and VJ. HM is away on a trip to Eastern Canada. NX really is working the DX on 14 Mc. MJ made a trip to VE5-Land and visited the gang at CBK Watrous. AL is QRL working on a new 813 rig. WC is rebuilding to eliminate the TVI. We are sorry to report that ZR has departed for VE2-Land. Good luck, Ernie and Barbara. Traffic: VE6AM 144, HM 122, OD 38, WC 18, YE 16, AL 13, MJ 5, IZ 4.

BRITISH COLUMBIA — SCM, Peter M. McIntyre, VE7JT — Sorry to report the passing of ZZ, one of the original hams in Vancouver and also one of the original signers of the charter of the British Columbia Amateur Radio Association. AAJ reports that on May 29th amateurs in the Okanagan took part in a civil defense exercise. Those known to have taken part were AAJ, EQ, FS, and QC. XY, at Dawson Creek, is bawling the fact that band conditions are poor. AUF, Lois, of Spring Island, has been appointed EC of District #2 of Vancouver Island. Congrats to the Royal City Amateur Radio Assn. on becoming an ARRL affiliated club. US suggests that 3755 kc. not be used for long ragchew QSOs but be kept as a listening-out frequency, which I believe was the original intention of 3755 kc. as well as being the net frequency. Make your initial call on 3755 kc. and if you make a contact, if you are a fixed home station, QSY up or down, which will leave the frequency clear for another call and especially for the mobiles. But don't forget to listen once in a while on 3755 kc. Another bad habit I have noticed is that someone gives a piece of traffic for relay during the net and all and sundry who have heard the traffic pre-net time get in the act and pass that traffic. Don't do it, let the person who received it pass it as he was asked to do by the originator. There will be no column next month as I will be away on vacation in W9-Land. I hope. Traffic: VE7QC 218, ASR 71, AUF 49, JT 19, ZV 18, ZF 12, FS 11, AIO 9.

SWITCH TO SAFETY!



Call Henry

FOR TOP-DOLLAR TRADE-INS

NEW SX 96



For top performance with extra pull power and ability to tune in stations.

\$25.00 Down

18 monthly payments of \$13.60
—\$249.95 Cash Price.



Bob Henry,
W0ARA
Butler, Mo.



Ted Henry
W6UOU
Los Angeles

HERE'S WHY!

- Top Trades
- Only 10% Down
- Easy Terms
- Fast Delivery
- Personal Service
- Low Prices
- Complete Stocks
- We want you to be satisfied. Ask any Ham about Henry. And Henry has the new equipment first.

Your orders and inquiries solicited. Write, phone, wire or visit either store. Complete stocks of all amateur equipment at money saving prices; maximum trades for your equipment; easy terms financed by us; personal attention; satisfaction guaranteed. Get quickest delivery of latest equipment from Henry. Contact Henry for wonderful bargains in reconditioned equipment that's like new.

A FEW OF THE ITEMS STOCKED ARE:

Collins 75A4.....	\$595.00	B&W 5100S.....	\$467.50	HQ140X.....	\$264.50
Collins 32V1.....	895.00	B&W 51SB.....	279.50	PRO-310.....	595.00
Collins KWS-1.....	1995.00	Central 10B.....	129.50	Hallicrafters S38D	49.95
Collins 32V3.....	775.00	Central 20A.....	199.50	Hallicrafters S85.	119.95
Ranger Kit.....	214.50	Central 600L.....	349.50	Hallicrafters SX99	149.95
Ranger wired.....	293.00	Elmac PMR 6 or 12	134.50	Hallicrafters SX96	249.95
Viking II kit.....	279.50	Elmac AF-67.....	177.00	National SW54...	49.95
Viking II wired.....	337.00	Morrow 5BR1.....	73.45	National NC88...	119.95
VFO kit.....	45.50	Morrow 5BRF.....	66.59	National NC98...	149.95
VFO wired.....	62.50	Morrow FTR.....	125.83	National NC125...	199.95
Adventurer kit.....	54.95	Gonset Super 6...	52.50	National NC183D...	399.50
Matchbox.....	49.85	Gonset Commander	124.50	National HRO60...	533.50
KW amplifier.....	1595.00	Gonset Commu-		H-W R-9.....	149.50
RMD DB-23.....	49.50	cator.....	229.50	H-W T-9.....	179.50
		Palco Bantam 65...	159.50		

PRICES SUBJECT TO CHANGE • A FEW PRICES HIGHER ON WEST COAST

Write, wire, phone or visit either store today.

Butler 1, Missouri
Phone 395



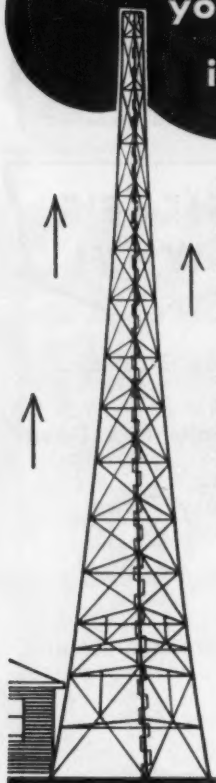
Henry Radio Stores

GRanite 7-6701

11240 West Olympic Blvd. Los Angeles 64



Now you can
afford to put
your beam up
in the air



Why be satisfied with inferior reception when an AERMOTOR ANTENNA TOWER costs so little? Put your beam up in the air and get clearer, stronger signals.

Aermotor Towers come to you in sturdy, galvanized sections... easy to erect, completely self-supporting, and wind resistant so that no guy wires are necessary.

97-FOOT TOWER

\$473

84 ft—\$375; 44 ft—\$195;

70 ft—\$307; 30 ft—\$140;

57 ft—\$250

f. o. b. Chicago

Liberal discount, if you qualify as a dealer—write for information.

AERMOTOR COMPANY

Dept. 6208, 2500 Roosevelt Road, Chicago 8

BUILDERS OF STEEL TOWERS SINCE 1888

EASY TO LEARN CODE

It is easy and pleasant to learn or increase speed the modern way—with an **Instructograph Code Teacher**. Excellent for the beginner or advanced student. A quick, practical and dependable method. Available tapes from beginning's alphabet to typical messages on all subjects. Speed range 5 to 40 WPM. Always ready, no QRM, beats having someone send to you.

ENDORSED BY THOUSANDS!

The **Instructograph Code Teacher** literally takes the place of an operator-instructor and enables anyone to learn and master code without further assistance. Thousands of successful operators have "acquired the code" with the **Instructograph System**. Write today for full particulars and convenient rental plans.



INSTRUCTOGRAPH COMPANY

4709 SHERIDAN ROAD, CHICAGO 46, ILLINOIS

Antenna Bridge

(Continued from page 16)

capacitor 30 to 50 times larger than the total tuning capacitance to counteract it. So a 0.002- μ f. capacitor was placed in series with the single-ended output terminal (stud of the coax connector) and the end terminal of the coil. Then the two binding posts were shorted with a piece of straight, round wire and the coax connector was plugged into a shorted female connector. The grid-dipper then showed resonance at 12.3 Mc. This indicated that the capacitor was about 30 per cent larger than it should have been so it was replaced with .0015 μ f. (1000 μ f. and 470 μ f. in parallel shown in the photograph). A grid-dip check with both input and output shorted then showed resonance at 14.6 Mc., again amply close.

The same balun turned out to require 4 μ f. (plus the 8 μ f. distributed) for shunt tuning at 28 Mc. and the series capacitor was 420 μ f. A 10 per cent error in the value of either of these capacitors is relatively unimportant. With the values indicated for 14.3 Mc., errors caused by the balun itself were so small as to be unreadable when used with a bridge such as the one described in this article (well below 1 per cent if the 50,000-ohm shunt-coil losses were used to determine a correction factor).

Omission of the leakage-reactance correction capacitor made quite a sizable error when measuring loads of 100 ohms or less at 28 Mc. Inclusion of the capacitor reduced these to less than 2 per cent for any value.

As mentioned previously, the 1000 μ f. and 470 μ f. forming the 0.00147- μ f. series capacitor for 20-meter operation are shown in the illustration between the outer terminal of the winding and the center stud of the connector. Either tuning capacitor (4 μ f. for 10 meters or 39 μ f. for 20 meters) can be connected externally across the binding posts.

When using the balun for 10 meters, the 1000- μ f. portion of the series capacitor is opened.

In conjunction with the bridge, the balun described can be used over a ± 500 -kc. range on 20 meters and ± 1 Mc. on 10 meters, without retuning.

Conclusion

The simple antenna bridge described here can be used for almost any type of r.f. impedance measurement that the amateur is called upon to make. The possibilities in this regard have only been touched upon in this article, but the many applications have been well covered in amateur literature. There is only one warning—do not, under any circumstances, leave the bridge in the circuit while the transmitter is in use. The bridge is a measuring instrument, not a device for monitoring the performance of the transmitter.

Strays

W2DIT and W2DAH both live on Long Island.

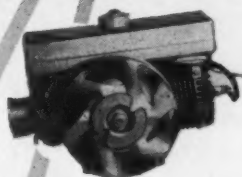
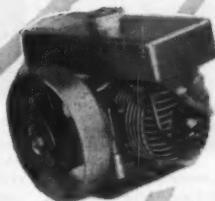
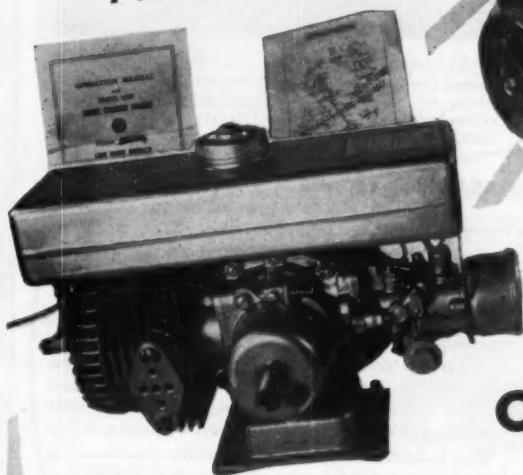
Buy of a Lifetime for: Portable Compressors, Rotary or Reel Type Lawn Mowers, Pumps, Generators, Elevators, Conveyors, Milking or Washing Machines, Scooters, Kid's Cars, Chain Saws, Back Pack Equipment, Bicycles, Farm and Shop Equipment, Cement Mixers!



RADIO SHACK SALE!

1½ hp GASOLINE ENGINE

1-Year Factory Guarantee!



\$ **29⁹⁵**
Only

FIRST TIME IN RADIO SHACK'S 32 YEARS that a bargain like this has come over the horizon — a bargain that anyone with a farm, camp, yard, shop, basement, garage or permanent or EMERGENCY job to do will recognize as outstanding. And EVERY ENGINE IS COVERED BY A FULL YEAR FACTORY GUARANTEE.

SPECIFICATIONS: Full 1½ horsepower; single cylinder; 1¾" bore; 1½" stroke with bronze connecting rod; horizontal power take-off shaft; open fan; governor cover; crankshaft runs on heavy duty ball bearings for leakproof sealing and quick starting; crankshaft hardened at rod bearing surface; enclosed governor unaffected by dirt or wind; carburetor has fuel screen, calibrated adjustment with range limit stops for easy setting, vibration-dampened float valve; non-clogging cooling system, self-cleaning open fan; positive lubrication — as long as engine has fuel it has complete lubrication! Has flywheel and cord for starting.

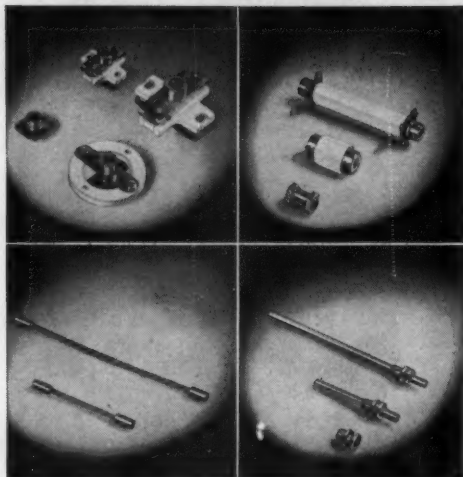
PHYSICAL SIZES: Light net weight only 14¾ lbs.; overall 9⅞" H x 13¼" L x 10¼" W; shaft diameter 0.6245"; usable shaft length 1⅞"; shaft end keyway 0.188"; cast base 4¾" x 4" with bolt holes. Ship. wt. 19 lbs. Silver finish. Guaranteed by well-known factory for one year, guaranteed first quality, guaranteed brand new and in original carton. IMMEDIATE DELIVERY — while our strictly limited quantity lasts! Order No. R-70699.....Sale Price \$29.95



RADIO SHACK CORPORATION

167 Washington Street, Boston 8, Massachusetts
and 230-234 Crown St., New Haven 10, Conn.

SHAFT COUPLINGS



Building it yourself? Then use JOHNSON couplings. Capable of many thousands of operating cycles without failure due to fatigue—manufactured with high quality, low loss insulation. All metal parts accurately machined and suitably finished. Phosphor bronze springs on the -250 and -251 series shaft couplings provide flexibility without backlash and adjust to minor shaft misalignments. Rigid types such as the -250 and -262 will meet requirements of accurate shaft alignment and high torque. The -259 is a bar type shaft coupling recommended for high voltages or very high frequencies—the -264 is a small bakelite insulated shaft coupling for DC or low voltage RF applications.

FLEXIBLE SHAFTS—Perfect for out-of-line or up to 90 degree angular control—phosphor bronze, non-rusting flexible shafts with 1/4" nickel plated brass hubs.

PANEL BEARING ASSEMBLIES—Panel bearings for 1/4" shafts and rigid 3" and 6" nickel plated brass shafts assembled in panel bearings. Shafts are 1/4"; bearings, furnished complete with 3/4" -24 nut, can be mounted on panels up to 3/4" thick. Special shaft lengths and locking type bearing assemblies available on special order.



E. F. JOHNSON COMPANY

2810 SECOND AVENUE S. W. • WASECA, MINNESOTA

GET YOUR COMMERCIAL TICKET EASIER WITH ...

RADIO OPERATOR'S LICENSE Q AND A MANUAL
(5th Edition)
by Milton Kaufman
Covers Elements 1 through 8. Complete discussion of answers to every technical question in the F.C.C. Study Guide! Used by over 50 leading schools. Only \$6.60 at jobbers, bookstores or direct from—



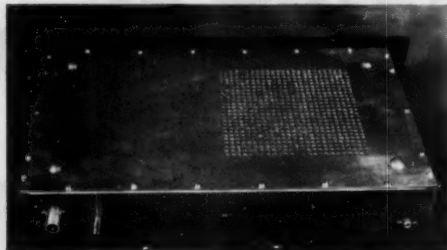


JOHN F. RIDER Publisher, Inc.
430 Canal Street, New York 13, N. Y.

807s in Parallel

(Continued from page 20)

the 750-volt 100-ma. condition. In this case, with maximum inductance in use, the Q will run around 17 or 18. Also, the values of input capacitance shown in the table include tube output capacitance and other stray capacitances, so that input capacitances of less than about 50 $\mu\text{f.}$ will probably be unattainable. Where the



The amplifier is enclosed in an inverted aluminum chassis in which the bottom plate serves as the top cover. Along the rear edge are the output coax connector, ground post, tip jacks for heater, screen and plate voltages, and r.f. input jack.

table shows less than 50 $\mu\text{f.}$ input capacitance, C_4 should be operated as close to minimum capacitance as practicable.

An exciter should be connected to J_1 , and the coupling adjusted to give about 7 ma. of amplifier grid current. With a 50-ohm load connected to the output, the input and output capacitances should be set as closely as possible to the values indicated in the table, and the variable inductor should be adjusted for resonance as indicated by the customary dip in plate current. Decreasing the output capacitance or the inductance (or both) while maintaining resonance with the input capacitor should increase loading. Adjustment in the opposite direction should decrease the loading.

"Little Gem"

(Continued from page 17)

of the dial settings at different frequencies can be made and placed on the back cover plate of the box, and the instrument used as an indicating wavemeter. The chart can be calibrated by the use of a grid-dip meter or VFO. It might be well to remember that the calibration (when used as a wavemeter) will change slightly if an external antenna is used. When microampere measurements are being made, test leads are plugged into the pin jacks and the meter is used like any standard microammeter. Care should be taken not to use the instrument in circuits where the current will deflect the meter over full scale. The amount of amplification that the transistor will have depends on the par-

(Continued on page 114)

**BUSY? BUSY?
LITTLE TIME FOR HAMMING?**

GO MOBILE!

..AND MAKE GOOD QSO USE OF YOUR DRIVING HOURS!

HARRISON HAS IT!



AF-67

Has all the features that give you greater operating results!

● **VFO**, and spotting switch! Enables your zeroing-in to a net frequency, a CQ, or into a clear spot, without QR'ing anyone. A "must" in the crowded bands.

● **Single knob bandswitch!** No matter the time nor location, you can quickly and easily jump to the band that will give you the solid local or DX QSO's you want. (Seven bands, 160 thru 10 meters.)

● **Power!** A respectable 40 to 50 watts OUTPUT, with good "rock" audio, keeps your signal right up there with the best of the KW's.

● **PLUS**—just about everything else you could desire in a modern, highly efficient, well constructed, compact (11 1/4" wide x 7" high x 8 1/2" deep), VFO transmitter for mobile, field, or fixed station stand-by or KW exciter.

AF-67, complete with tubes, quick-disconnect power plug, for 6/12 volt systems, and full installation and operating instructions. **\$177.00**

**THREE—
for the price of ONE!**

Slip the PMR-6A Receiver and the AF-67 Transmitter out of the car, and just by plugging in these AC operated power supplies you have a complete, compact, home and portable field station, or VFO exciter for KW final Triple duty, ready for any service or emergency.

PSR-110S



Of course—

Harrison has all of the good makes of Ham equipment!

Just order, or ask for literature and our low prices.

PS-2V



115 Volt AC supply for complete operation of 6 or 12 volt model Receiver. With cable and plug.

PSR-110 — \$24.50

Same, but with 5 meter.

PSR-110S — \$35.50

Dual output supply for full power operation of the AF-67 Transmitter. Complete with cable and plug to match transmitter, and internal push-to-talk control. **\$56.25**

Coaxial antenna change-over relay with 115 Volt AC coil. **\$9.25**

**MULTI-ELMAC
EQUIPMENT**

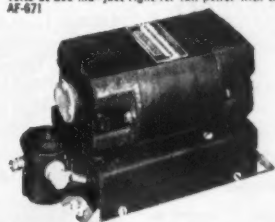
to give you more fun per mile!

Ask any of the thousands of hams now using the AF-67! Or, see for yourself how much real enjoyment it gives, by getting yours right now, before you take that vacation trip.

Order your new car less radio! Because, for a few dollars more, a Multi-Elmac receiver gives you full broadcast coverage, PLUS dual conversion, highly selective and sensitive bandspread reception of all ham bands 160 thru 10!

SAVE \$60

on this complete dynamotor supply, of top quality, with RF-AM filters and control relay. Delivers 500 volts at 200 ma—just right for full power with the AF-67!



Model S20VWX, 6 volt DC input. Brand new overstock, fully guaranteed. Regular net dealer price is \$90.25—
it's yours for only \$30.25 with the purchase of an AF-67.

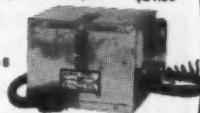
Quantity limited—
so, hurry!

A complete 10 tube job, with internal noise limiter, BFO, RF stage, and everything else you would expect in a modern communications receiver—all in a cabinet only 6" wide, 4 1/2" high, by 8 1/2" deep! (Specify 6 or 12 volt system) **PMR-6A \$134.50**

Speaker. Oval auto type, for mounting in dash. Heavy PM magnet, to handle the 3 1/2 watts output of the receiver. **8" x 7" — \$3.95** **6" x 9" — \$4.50**

Multi-Elmac receiver power supply. Exceptionally well filtered and shielded. Mount anywhere—remote controlled by receiver. With cable and connector plug. Specify for 6 or 12 volt system. **\$24.50**

PSR-6



Round out your installation with these recommended top quality accessories:

Microphones. Shure controlled reluctance. Police type hand mike, with push-to-talk button. Dash mounting bracket. **\$17.35**

Antenna change-over relay. Coaxial type. With contacts for push-talk control. 6 or 12 volts DC. **\$10.50**

Webster "Band Spanner" Antenna. Telescopic tuning for 10 thru 75 meter bands. Stainless steel top whip. **\$29.50**

Promax antenna mount. Link chain type, clamps on to any bumper with 1" clearance. No holes to drill! Type CA—**\$5.88**

Heavy duty spring for CA—**\$6.47**

Master Mobile DeLuxe "Any-angle" body mount. Heavy duty stainless steel spring. Coax connector. 132XKSC—**\$15.95**

Steel frame mounting racks. Fasten to bottom of dash, etc., unit is held in cushion grip, can slide out for fixed station use.

For AF-67 or PMR-6A **\$6.95**

Mike plug RG-8/U coaxial cable. The good kind! Per foot **13¢**

Coax connectors **SIX for \$4.50**

Heavy dynamotor cable Per foot—**18¢**

**FDA
MATCHING
FUNDS
APPROVED**

TRADES? Yes! Tops!

10% lets you start having fun, now! Take a year to pay, on Harrison's low cost, confidential terms.

SAFETY FIRST!

Keep both hands on the wheel, and your eyes on the road!

1. Use a Turner "Third Hand" to hold the mike in front of your lips. (\$2.94). Light-weight yoke slips around neck. Special Shure controlled reluctance hand microphone, quickly screws on or off "Third Hand". **\$8.92**

2. Put a "Foot-to-talk" switch in the floor-board, and connect across push-to-talk control wires. **\$1.89**

3. Mount the receiver where you can tune and see the dial without looking away from the road.

HARRISON
Ham Headquarters Since 1925
**225 GREENWICH STREET
NEW YORK 7, N.Y.**
PHONE ORDERS - BARCLAY 7-7777
JAMAICA STORE: Hillside Ave. at 145th St.

Harrison has it! And, how!

To give you immediate delivery, we have made special arrangements to have, right in our NY and Jamaica stock rooms, the largest supply of Multi-Elmac equipment and accessories in the entire country! But, don't procrastinate—we expect it to sell very briskly (it's that good!)

Installations?

Certainly! Complete, professional job at reasonable cost.

ALL ORDERS FILLED AT THE LOWEST FACTORY PRICES IN EFFECT AT TIME OF SHIPMENT

2, 6, 160-10 METER TRANSMITTERS

Special Freq. 500 kc. to 160 mc.



LETTINE MODEL 240 TRANSMITTER WITH MOBILE CONNECTIONS AND A.C. POWER SUPPLY

This outstanding transmitter has been acclaimed a great performer throughout the world. Air wound plug-in coils used for high efficiency. Takes any freq. from 1.6 to 30 mc. Ideal for General Class, Novice, C.A.P., C.D., Industrial. Sold direct from our factory, ready to operate. 40 to 50 watts input. Phone-CW. Complete with 8 x 14 x 8 cabinet, 40 meter coils, xtal, tubes: 6V6 osc., 807 final, 5U4G rect., 6SJ7 xtal mike amp., 6N7 phase inv., 2-6L6's P1 mod. Wt. 30 lbs. \$79.95. 80, 20, 10 meter coils \$2.91 per band. 160 meter coils \$3.60.

MODEL 130 FOR 120 TO 130 WATTS—\$199.50
807 osc., 2-807's final, 6N7 xtal mike amp., 807 AF driver, 2-807's mod., 2-866A's rect., 6L6 clamper. Wt. only 47 lbs.

MODEL 242 FOR 2 METERS—45 WATTS INPUT—6146 FINAL. Complete with mobile connections, A.C. power supply, tubes, xtal. Xtal mike input. Uses 8 mc. xtals. Swinging link matches 52 — 300 ohm antennas. Same cab. as 240. \$89.95. Also 6 meter model.

LETTINE VFO & ANTENNA TUNER IN STOCK

Send full amount or \$25 with order — balance C.O.D.

LETTINE RADIO MFG. CO.

62 Berkeley St.

Valley Stream, N. Y.

Every
ham
needs
this
famous



The
BUG

VIBROPLEX Semi-Automatic Key

The Vibroplex bug does all the arm-tiring work for you — automatically. Relieves nervous and muscular tension so noticeable when sending by hand. Suits any hand. No special skill required. Adjustable to any speed and any degree of key tension. Easy to operate. Beginners use it in a matter of minutes. Built for long life and rough usage. Vibroplex is the only key with **Jewel movement** — insuring better and easier keying. Used and recommended by thousands of hams and commercial operators on land, sea and in the air. Five models, \$15.95 to \$29.95. Left-hand models, \$2.50 more. Order yours today. At dealers or direct. **FREE** folder.

Headquarters for NEW portables, all models and styles of type. Also, **REBUILT** standard and portable typewriters with **ALL CAPITAL** letters and other styles of type. Quick service. Get our prices before you buy!

THE VIBROPLEX CO., INC.
833 Broadway New York 3, N. Y.



ticular transistor used. The transistor in this unit was found to have a current gain of 20, or 26 db., so that full-scale deflection on the 0-1-ma. meter was 50 μ a. To calibrate the meter for microammeter measurements, a simple calibration circuit can be set up using a dry cell and several known resistances. A diagram of the circuit is shown in Fig. 2. Currents that will flow in the circuit with given resistances are also shown. By the use of

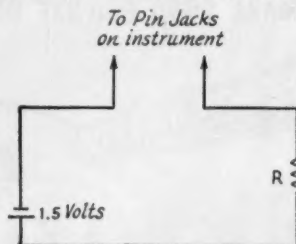


Fig. 2 — Microammeter-calibration circuit using known resistances and voltage. By using a 1.5-volt cell and known resistances R , current I will flow in the circuit. Naturally, the closer tolerance resistors will give more precise calibrations.

R (ohms)	I (μ a.)
150,000	10
68,000	22
47,000	32
33,000	45
18,000	83
15,000	100

Ohm's Law any current flow through the circuit can be calculated if the resistance and voltage are known. By plugging in a pair of headphones and setting the function switch on field-strength meter, the quality of a 'phone signal may be observed. The transistor is acting as an amplifier in this position, so the gain will be more than enough for strong headphone volume. This feature will be appreciated when monitoring a mobile 'phone signal, where the signal strength is low.

The basic movement of the meter in this instrument may be used by switching the function switch to milliammeter. Leads are connected to the pin jacks and the instrument is used accordingly. External shunts may be used with the basic 0-1 ma. movement to provide an extremely wide range of current measurement.

A PNP junction transistor was used in this unit. However, a NPN type may be used if the cell, meter, and tip-jack leads are reversed.

& Strays

W1KCT reports the following equipment stolen from his home: a Viking II (serial 6670), a Viking VFO, an HRO-7 (serial 2050256) with power supply and speaker, a Turner 22X microphone, a McElroy bug, and a conventional key.

At least 38 radio "stars" in the sky are now known to be sending out radio waves picked up on earth by giant antennas, an international committee of radio astronomers has concluded.

— *Science News Letter*

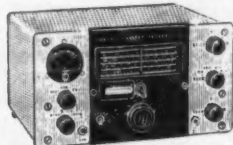
The Transistor Age



HALLICRAFTERS SX-96.
Less speaker. Net \$249.95



NATIONAL NC-98. Less speaker. Net \$149.95



HARVEY-WELLS BANDMASTER
MATCHING TRANSMITTER AND RECEIVER.
Model T-90 TRANSMITTER. 90 watts input.
Built-in VFO or crystal. CW and Phone.
Bandswitching. Six bands 80 through 10
meters. With tubes, less power supply.
Net \$179.50



Model R-9 Receiver. Double
conversion. Six bands 80
through 10 meters. 9 tubes.
5 meter. Less speaker.
Net \$149.50



HAMMARLUND HQ-140-X. Less speaker. Net \$264.50

ELMAC AF-67 TRANS-CITER.
Net \$177.00

WRITE FOR FULL INFOR-
MATION ABOUT OUR
TIME PAYMENT PLAN

All prices f. o. b. St. Louis
Phone: CHestnut 1-1125

Walter Ashe
RADIO CO.
1125 PINE ST. • ST. LOUIS 1, MO.

---FREE CATALOG! Send for your copy today---

WALTER ASHE RADIO COMPANY
1125 Pine Street, St. Louis 1, Missouri

Q-8-55

☐ Rush "Surprise" Trade-in offer on my _____

for _____
(show make and model number of new equipment desired)

☐ Send latest Catalog.

Name _____

Address _____

City _____ Zone _____ State _____



**BEFORE
YOU BUY
OR
TRADE
ANY HAM
GEAR
SEE**

WARD, W2FEU

for the best deal . . .

Time Payments Arranged at Low Cost
Through Our Local Bank on Purchases
of \$100.00 Net and Over

Write, Wire or Call

Ward, W2FEU

At

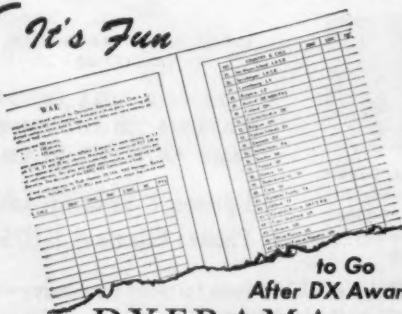
ADIRONDACK RADIO SUPPLY

185-191 W. Main St., Amsterdam, N. Y.

Tel. Victor 2-8350

Ward J. Hinkle, Owner

It's Fun



DXERAMA
to Go
After DX Awards

tells you how to do it and gives you a place to log your progress. More than 30 Awards from all over the world fully explained: DXCC, HV22, TPA, everything from AAA to WWI. Nicely printed on good paper, heavy covers, well indexed, 8½" x 11", 64 pages.

\$1.35 U.S.A. & Possessions

\$1.60 Foreign

Compiled by W3AXT

Order from your Distributor or direct from

DXERAMA

RFD 1, Box 127, Lancaster, Pa.

Power and Meter Facts

(Continued from page 25)

will do.) Next, I adjust the coupling of the feed-line to the final. The coupling is set for maximum power output at a given plate current at resonance. If the coupling is increased, the d.c. plate current goes up, but the output either remains constant or decreases. This point of maximum output for a given amount of input comes close to the magic point of proper adjustment for all linear amplifiers. The old method of loading by reference to "dip at resonance" is not recommended. Once we have reached the suggested adjustment, we have had it as far as coupling goes. If the d.c. current is less than 300 ma. (for the amplifier under discussion), we simply don't have enough linear drive.

Now, regardless of the power I believe my amplifier should handle, I make a crude check to determine at what point it actually flattens. I vary the amount of carrier insertion, watching mainly the output indication, and note the point at which increasing the carrier no longer results in a rapid increase in output. I now observe the plate meter reading, hoping in this case that it is up to 300 ma. I use this figure to multiply by plate voltage. This is roughly my maximum-signal linear power available. Suppose my linear drive available limits my actual plate current to 250 ma. My maximum signal power is then only 375 watts instead of the possible 450.

Next, I remove the carrier. I change to voice. This is the point where experience in using a 'scope counts. I know that my voice, using the average plate meter, will deflect the meter only about half as far, for the same maximum signal power, as the carrier did. Thus, since my steady signal current was 250 ma., I wouldn't expect much over 125 ma. on normal talking. The only way to achieve more meter swing under this set of amplifier conditions and not splatter would be to use properly designed and adjusted compression in the exciter's audio.

Reviewing the preceding material, you can determine that my "meter peak, on voice" or legal power, is only 187 watts (125 ma. \times 1500 volts). My maximum signal or peak envelope power is 375 watts (250 ma. \times 1500 volts). The instantaneous peak power is about 750 watts. As the saying goes, "You pays your money and takes your choice."

Actually, your voice might be able to swing the meter somewhat more than mine for the same amount of maximum signal power. If I were using a Class AB amplifier I would expect the meter to swing somewhat higher on voice in relation to its reading on steady signal.

Don't think that I am recommending the above procedure as a replacement for legitimate "two tone" adjustment with a 'scope. Anyone who has worked with linear amplifiers knows that inserting large amounts of steady signal (carrier or single tone is worse; "two tone" less punishing) has the rather disconcerting and costly tendency

(Continued on page 118)

"Worked 87 foreign countries, all continents and 30 zones" with a Gotham Antenna and 35 watts.

READ THIS AMAZING LETTER: How an inexpensive **FULL SIZE** Gotham Rotary Beam made it possible to "work the world!"

Gotham Hobby Corp.
107 East 126th St.
New York 35, N. Y.
Gentlemen:

Florida, 13 May 1955

I'd like to express my enthusiasm and satisfaction regarding your 20-meter rotary beam antenna. I purchased one of your standard two-element units in February of this year. Prior to this time I had been using a collinear array about one wavelength above ground. The transmitter feeding this antenna had a power output of about 35 watts, and results were quite discouraging.

When my Gotham arrived, it was easily assembled in a couple hours. The same transmitter was used to excite the Gotham antenna, using the same power as before. Results have been quite gratifying, and it is interesting to note that in the three months since using the Gotham antenna, I have worked 87 foreign countries, all continents, and 30 zones.

I am able to keep schedule with amateur radio —* in the Cape Verde Islands every week. It was impossible to even hear this station before using the Gotham beam.

Extremely high winds are prevalent in this part of Florida. The Gotham beam has withstood blows in excess of 50 miles an hour without failure.

The elements bend almost double in these high winds, but readily return to their original configuration when the wind abates. I feel that this is an extremely important feature of the Gotham antenna.

I have enthusiastically recommended Gotham to all the hams who ask what type I am using (and most of them do, when I tell them the amount of power I'm using). I wish you every success with your product, and feel that it is well worth the modest price.

Yours very truly,

(Names and *call letters upon request.)

EVERY FULL-SIZE GOTHAM ROTARY BEAM IS ENGINEERED FOR SIMPLICITY, STRENGTH, PERFORMANCE

Your Gotham comes to you completely fabricated, made (except for the polystyrene insulator) entirely of new, rustless, first-quality mill stock aluminum. You'll find no link coupling, no complicated mounts, no tuning stubs. You get good, solid aluminum tubing—and more of it, in both length and thickness (the only true gauge of \$ value!) No flimsy wire, no wood to rot or weather-proof.

Easy assembly, simple and quick matching of line to antenna. Yet Gotham's price is 25% to 75% lower than the "toy" midjet beams which Gotham so easily out-performs.

MAIL THIS COUPON TODAY!
10-DAY MONEY BACK GUARANTEE

See sample
beams and
literature
at these
Gotham
distributors!

HOW TO ORDER:

Send coupon with check or money-order to your local distributor or direct to Gotham. Immediate shipments via Railway Express, charges collect; foreign shipments sent cheapest way.

Arizona: Kennedy Radio, 4511 N. 8th St., Phoenix
California: Offenbach & Reimus Co., 1569 Street, Market San Francisco.
Florida: Kinkade Radio Supply, Inc., 402 W. Fortune St., Tampa.
Indiana: Graham Electronic Supply, 102 S. Penn St., Indianapolis.
Iowa: Radio Trade Supply Co., 1224 Grand Ave., Des Moines.
Iowa: World Radio Labs., 3415 W. Broadway, Council Bluffs.
Kentucky: Universal Radio Supply, 533 S. 7th St., Louisville.
Louisiana: Radio Parts, Inc., 807 Howard Ave., New Orleans.
Michigan: M. N. Duffy & Co., 2040 Grand River, Detroit.
Michigan: Purchase Radio Supply, 605 Church St., Ann Arbor.
Minnesota: Lew Bonn Co., 67 South 12th St., Minneapolis.
Missouri: Henry Radio, Butler, Mo.
New Hampshire: Evans Radio, Concord.
N. Carolina: Allied Electronics, 411 Hillsboro St., Raleigh.
N. Dakota: Fargo Radio Service, 515 Third Ave., North, Fargo.
Ohio: Mytronic Company, 2145 Florence Ave., Cincinnati.
Ohio: Selectronic Supplies, Inc., 1320 Madison Ave., Toledo.
Ohio: Srecco, Inc., 135 E. 2nd St., Dayton.
Pennsylvania: Radio Electric Service Co., 7th & Arch Sts., Philadelphia.
S. Dakota: Burghardt Radio Supply, Inc., Watertown, Aberdeen.
Virginia: Radio Equipment Co., 819 W. 21st St., Norfolk.
Virginia: Radio Supply Co., 3302 West Broad St., Richmond.
Washington: Western Electronic Supply, 717 Dexter Ave., Seattle.
Canada: Louis Desrochers, P.O. Box 688, Amos, Quebec.

GOTHAM HOBBY CORPORATION 107 E. 126th ST. NEW YORK 35, N. Y.

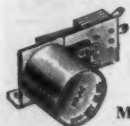
Enclosed find check or money-order for:

- | | | |
|--|--------|--|
| 2 METER BEAMS | | |
| <input type="checkbox"/> Deluxe 6-Element | \$9.95 | <input type="checkbox"/> 12-El \$16.95 |
| 6 METER BEAMS | | |
| <input type="checkbox"/> Std. 3-El Gamma match | 12.95 | <input type="checkbox"/> T match 14.95 |
| <input type="checkbox"/> Deluxe 3-El Gamma match | 21.95 | <input type="checkbox"/> T match 24.95 |
| <input type="checkbox"/> Std. 4-El Gamma match | 16.95 | <input type="checkbox"/> T match 19.95 |
| <input type="checkbox"/> Deluxe 4-El Gamma match | 25.95 | <input type="checkbox"/> T match 28.95 |
| 10 METER BEAMS | | |
| <input type="checkbox"/> Std. 2-El Gamma match | 11.95 | <input type="checkbox"/> T match 14.95 |
| <input type="checkbox"/> Deluxe 2-El Gamma match | 18.95 | <input type="checkbox"/> T match 21.95 |
| <input type="checkbox"/> Std. 3-El Gamma match | 16.95 | <input type="checkbox"/> T match 18.95 |
| <input type="checkbox"/> Deluxe 3-El Gamma match | 22.95 | <input type="checkbox"/> T match 25.95 |
| <input type="checkbox"/> Std. 4-El Gamma match | 21.95 | <input type="checkbox"/> T match 24.95 |
| <input type="checkbox"/> Deluxe 4-El Gamma match | 27.95 | <input type="checkbox"/> T match 30.95 |
| 15 METER BEAMS | | |
| <input type="checkbox"/> Std. 2-El Gamma match | 19.95 | <input type="checkbox"/> T match 22.95 |
| <input type="checkbox"/> Deluxe 2-El Gamma match | 29.95 | <input type="checkbox"/> T match 32.95 |
| <input type="checkbox"/> Std. 3-El Gamma match | 26.95 | <input type="checkbox"/> T match 29.95 |
| <input type="checkbox"/> Deluxe 3-El Gamma match | 36.95 | <input type="checkbox"/> T match 39.95 |
| 20 METER BEAMS | | |
| <input type="checkbox"/> Std. 2-El Gamma match | 21.95 | <input type="checkbox"/> T match 24.95 |
| <input type="checkbox"/> Deluxe 2-El Gamma match | 31.95 | <input type="checkbox"/> T match 34.95 |
| <input type="checkbox"/> Std. 3-El Gamma match | 34.95 | <input type="checkbox"/> T match 37.95 |
| <input type="checkbox"/> Deluxe 3-El Gamma match | 46.95 | <input type="checkbox"/> T match 49.95 |

(Note: Gamma-match beams use 52 or 72 ohm coax.
T-match beams use 300 ohm line.)

Name.....
Address.....
City.....Zone.....State.....

MIDGET ALL-PURPOSE POWER RELAYS BY DOW



Model DKP

DKP

... a new class of relay
for Radio and Industry

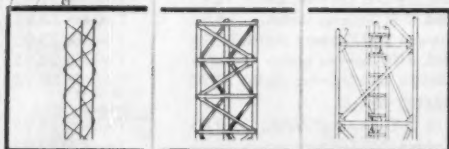
SILENT as a DC relay, rated at 25 amps non-inductive load at 110 V... mounts easily under a 1½" chassis... carefully engineered for control circuits, motor starting... quiet, rugged... linkage and lost motion eliminated by direct magnet thrust... this versatile relay solves mounting problems: easily changed mounting foot allows combinations for chassis, bank or rack mountings... heavy leaf springs and ¾" coin silver contacts with operate time of 2 to 5 milliseconds put the DOW Midget All-Purpose Power Relay in a class by itself.

Amateur Net		
Contacts	AC	DC
SPST.....	\$5.85	\$5.50
SPDT.....	5.90	5.60
DPST.....	6.00	5.70
DPDT.....	6.25	5.95

THE DOW-KEY CO., Inc.
WARREN, MINNESOTA

TRYLON Towers and Masts

Amateur radio types • Guyed towers for
FM-TV antennas • Vertical Radiators •
Microwave towers • Commercial Communica-
tion towers • Transmission line supports, etc.



SERIES 650

Height to 80'
Width—6.5"
10' section—
22 lbs.
Use—Mast for TV
Amateur, Port-
able, and Wire
type antennas

SERIES 2400

Height to 280'
Width—22.6"
10' section—
112 lbs.
Use—Tower for
Trylon Rotary
Beam, AM
Broadcast, and
Microwave
antennas

SERIES 6000

Height to 600'
Width—60"
10' section—
653 lbs.
Use—TV Broad-
casting and
curtain antennas
for International
Broadcasting

* Between CG of Tower Legs

Trylon Towers are made only by

WIND TURBINE CO., WEST CHESTER, PA.

of making vacuum tubes melt. Discretion is al-
ways indicated when making adjustments. How-
ever, if cautiously used, the procedure is guar-
anteed to do one thing — to produce a signal
vastly more neighborly than one generated in an
all-out attempt to wrap the pointer around the
pin.

While I have been writing, I have had a vague
feeling of someone looking over my shoulder and
wanting to say, "I always knew there was some
reason why those 'sidebanders' sound so terrible
and are so broad. Now I know. They are all
'meter benders'!"

Well, old man, I don't want to start an argu-
ment now, but remember the saying about people
who live in glass houses. Just because "sideband-
ers" as a whole are "distortion conscious" it
doesn't necessarily mean that they invented the
stuff. Sideband enthusiasts with their s.s.b. re-
ceiver, transmitters, and voice-control operation,
are actually achieving a worth-while increase in
voice communication — per kilocycle per watt
per hour. This would be impossible if the linear-
amplifier situation was really "rotten."

This is not a plea for more than a small per-
centage of the present operators to become less meter
happy. The purpose is to collect a few facts about
the use of d.c. meters in voice circuits and to give
some pointers concerning power calculations.

Almost everyone who first uses a linear ampli-
fier in s.s.b. service thinks first of the power avail-
able. If things progress normally, a change occurs.
At some point he starts adjusting for linearity and
then accepts the power that results. When that
happens, you know that he has graduated into a
new and mature attitude toward our old friend
Mr. D. C. Plate Milliammeter.

One Tube

(Continued from page 28)

characteristic of practically all transmitters that
an r.f. click will be generated by the opening and
closing of the key. While this click may not travel
far on the air, it can still be nasty enough to cause
interference to neighboring broadcast and TV
sets as well as the operator's own receiver. It is a
simple matter to get rid of the click, and two
capacitors and r.f. chokes will do the job. The
important thing about using a filter is that it be
mounted right at the key.

For testing purposes, a dummy antenna
should be connected to the output terminal.
Use a 40- or 60-watt electric lamp for the dummy
load. The key plug is inserted in its jack and the
key is left open. With the 115-volt line connected
to the rig, S_1 is turned on and the 6X5 filaments
are allowed to warm up for a minute or so. Then
 S_2 is turned on and the 5Y3 allowed to warm up
for another few minutes. The power supply is
switched to the low-voltage output. The key is
then closed and the plate capacitor tuned for
resonance as indicated by minimum brilliance in

(Continued on page 120)



FORT ORANGE

Radio Distributing Co., INC.

904 BROADWAY, ALBANY 4, N. Y., U. S. A.

AMATEUR HEADQUARTERS

Uncledave's new
catalogue - free.
Write for it!!!!

Call Albany 5-3379; nites, 2-7729

All units sold on
TIME PAYMENT
PLAN

GONSET

Model 3035
\$229.50

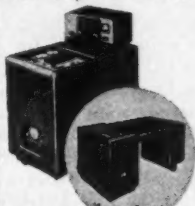


6V-120V
2 Meters

3057 229.50
12V-110V-2 Meters
3049 229.50
6V-110V-6 Meters
3058 229.50
12V-110V-6 Meters

JOHNSON VIKING KW - P.A.

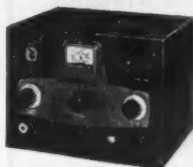
240-1000 1595.00
Desk Top 123.50



VIKING II

Kit 279.50
W/T 337.50

JOHNSON ADVENTURER



Kit with tubes 54.95

JOHNSON RANGER

Kit 214.50
W/T 293.00
Keying Kit 5.95

HALLICRAFTERS



SX96 249.50
S93 99.95
S38D 49.95
S53A 89.50
S85 119.50
SX99 149.50
R46B Spkr for SX96,
SX99 19.95

HT30-Transmitter
Exciter 349.95

COLLINS 32V-3 TRANSMITTER



775.00

VFO Controlled, Band-
switching, Gangtuned.
Covers 80, 40, 20, 15,
11 and 10 meters; 150
watts CW; 120 watts
phone; entire RF sec-
tion enclosed in metal
shield. (In Stock)

75A3 RCVR 550.00

VIKING MOBILE XMTR KIT

\$99.50 Net

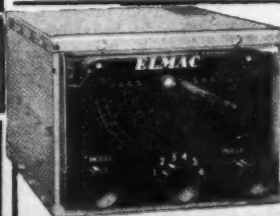
Write Uncledave
W2APF
with your needs
and problems.

PARTIAL LIST OF USED EQUIPMENT

Hallcrafters S76 (L.N.) 145.00
Meissner Ex. Sig. Shifter (L.N.) 65.00
Globe King 500 (W/VFO & Coils) 350.00
Collins 32V2 (L.N.) 450.00
Collins 32V3 (L.N.) 595.00
National HFS (W/5886 P.S.) 95.00
Eldico TR75 50.00
Eldico MB40 (Modulator) 50.00
National HR07 (W/Coils-P.S. & Spkr) 145.00
National NC183 (With Spkr) 275.00
National HRO-60 (W/Coils & Spkr).... 395.00

SPECIALS

Carbon Hand Mic. W/Switch
(To 17B Type) 2.50
J38 Keys 1.25
24 Hr. Ham Clocks (No GMT IND.).. 11.95
New GN45B-Generators
(6V DC INP.-400V-160 MA-Out.).. 15.00
On the Air Lites (6V-Lamp)..... 1.00



ELMAC PMR6A RECEIVER

6 or 12V DC-134.50
PSR6 or PSR12
Power Supply- 24.50

AF67-Transciter
\$177.00

NATIONAL

HR060T 549.50
(complete with coils & spkr)
SW54 49.95
NC88 119.95
NC98 149.95
Spkr 11.00
NC183D 399.50
Spkr 16.00
NC125 199.95
Spkr 11.00

HARVEY WELLS

T-90 179.50
R-9 149.50

POWER SUPPLIES

VPST90 89.50
VPSR9 28.50

"Z" Match Coupler
\$69.00

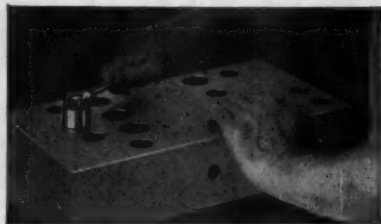
TECRAFT

2 meter converter
\$42.50
Power supply.. 17.95

24 HR. SERVICE
on stock items

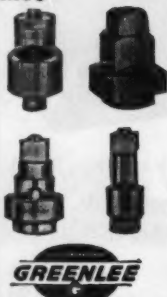
WE SPECIALIZE IN FOREIGN TRADE

SAVE HOURS OF WORK



quickly make round, square, key and "D" openings with Greenlee Radio Chassis Punches

In 1½ minutes or less you can make a smooth, accurate hole in metal, bakelite or hard rubber with a GREENLEE Punch. Easy to operate ... simply turn with an ordinary wrench. Wide range of sizes. Write for details. Greenlee Tool Co., 1868 Columbia Ave., Rockford, Ill.



Proven Performance



MODEL
CD-2
FCDA
APPROVED



DOUBLE CONVERSION RECEIVER PLATE MODULATED P.P. FINAL

- Available for 2 Mtrs. or 6 Mtrs.
- Designed for CD, Fixed or Mobile
- Your complete CD station

BEING BUILT FOR CD
OF MANY STATES

SONAR RADIO CORP
3050 WEST 21st ST., B'KLYN, N. Y.

A complete resume available
on request to CD Division -

the plate dial lamp. The dummy lamp should also light up at this point. Don't expect the lamp to be at full brilliance. While lamp bulbs make a convenient dummy antenna, they don't always match the output characteristics of a transmitter and consequently won't load the transmitter fully.

For 40-meter operation, a 40-meter crystal should be inserted in the crystal socket and S_4 switched to short out the unused portion of the plate coil. Tune-up procedure is the same as on 80 meters.

It is possible to use an 80-meter crystal and double in the plate circuit for 40-meter operation. However, for maximum efficiency, it is best to have crystals of frequencies that fall in the band in use.

To put the rig on the air, it is imperative that an antenna coupler be used. The unit described here was given extensive on-the-air tests. The antenna coupler used was the one described by the writer in *QST* for April, 1955. The antenna was 135 feet long, center-fed with open-wire TV line. Over 70 contacts in 30 states were made in a 4-day session.

In constructing, testing, and using this transmitter or any transmitter for that matter, the beginner should always exercise extreme caution in dealing with electric power. Be sure and check that all voltages are off before touching any of the components below deck and in the shield box.

Buffalo RACES

(Continued from page 44)

rigs capable of being removed and operated on either 110 v. a.c. or 6 v. d.c. They use 19-inch vertical whips.

The Aid Check Points are located around the perimeter of the heavily-populated areas. These RACES stations utilize a unit with 17 watts output to a ground-plane antenna.

Each of the fifteen large townships in Erie County has what is called a Report Center. Each Report Center has a complete RACES radio station to relay traffic from the local area directors to the main Control Center. These stations at the Report Centers utilize 100-watt transmitters feeding a beam antenna centered on the Control Center in Lancaster, N. Y. All antennas are vertically polarized for compatibility.

All installations are completely independent of commercial mains by virtue of having a gasoline-driven a.c. generator available delivering from 2 to 5 kilowatts, depending upon requirements.

Many of you reading this article will probably ask where do the personnel to operate a communications system of this size come from. When General E. G. Ziegler, the County Director of Civil Defense, originally outlined his requirements for RACES communications, we knew that only with complete cooperation from the local

(Continued on page 122)

Why take less for that trade?

you'll do better when you deal at Burghardt's!

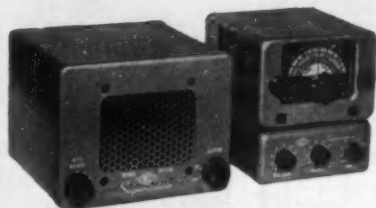


10% Down—Easy Terms
—10% down lets you "take it away." Up to 18 months to pay on balances over \$200. Burghardt's financing saves you money—adjusts terms to your budget. All time payments based on local bank rates. Full payment within 90 days cancels interest.

Speedy Delivery—Personal Attention—No order too large or small for personal attention. All inquiries acknowledged and orders processed day received.



Satisfaction Guaranteed
or your money refunded
after 10 day trial.



GONSET SUPER SIX CONVERTER

An outstanding six-band amateur mobile converter. Covers 75, 40, 20, 15, and 11-10 meters. Also has 19 and 49 meter BC band coverage for casual listening. Very high sensitivity using an 8 ft. whip.

ONLY \$5.25 DOWN

\$4.17 per month for 12 months

GONSET NOISE CLIPPER—standby of a great many mobile operators. Greatly reduces ignition and similar types of interference. Easily installed on any receiver, fixed or mobile, with conventional diode second detector circuits.

ONLY \$9.25

B & W SINGLE SIDEBAND GENERATOR AND THE NEW 5100S TRANSMITTER

What a combination! Teamed up with the new 5100S transmitter, this B & W Single Sideband Generator gives you outstanding SSB operation on all the frequencies provided in the 5100S. Tuning and operation is a breeze — no test equipment required. Completely self-contained, the 51SB requires no external accessories other than a microphone. The 5100S gives you 150 watts input on SSB and CW, 130 watts on AM phone. Other features include: VFO or crystal operation and a pi-network final. The 51 SB cabinet bolts directly onto the 5100S cabinet, extending the 22" length to 32". Easy to install, the 51SB comes factory wired and tested, complete with all tubes and necessary hardware.

GONSET SUPER-CEIVER

Used in conjunction with any quality amateur converter, the compact SUPER-CEIVER provides mobile performance comparable to that of a high quality fixed-station unit. Performance is outstanding on both phone and CW — unit is crystal controlled for maximum stability. Eight tuned circuits at 262 kc provides high selectivity. Self-contained vibrator power supply furnishes voltage regulated power to the converter and to the BFO. Latter is highly stable with adjustable pitch control. Separate RF and AF gain controls and adjustable squelch. Highly effective noise clipper—unit has internal speaker—connections provided for external speaker, if desired. Easily converted to 12 Volts.

\$6.51 per month for 18 months

ONLY \$11.95 DOWN
(Price does not include converter)



B & W 5100S and 51SB—Completely bandswitching on 80, 40, 20, 15 and 11-10 meters. With back wave diminution and excellent keying and break-in. **ONLY \$74.70 DOWN.**

B & W 5100S ONLY \$46.75 DOWN

B & W 51SB ONLY \$27.95 DOWN



B & W SINGLE SIDEBAND RECEIVING ADAPTER

Now—convert your present receiver for: True single-signal reception on CW—Selective sideband reception on AM—Superb performance on SSB. May be used with any receiver having an intermediate frequency between 450 and 500 kc. "Gating control" permits tuning over a narrow frequency range without disturbing main receiver tuning.

Easy to install and adjust, unit is entirely self-contained in an attractive cabinet complete with power supply and a 7" dynamic speaker.

Price Soon to be Announced

TOP TRADE-INS!

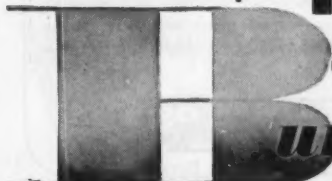
Write for our latest bulletin. We have hundreds of standard brand pieces of equipment in our trade-in department—used equipment made by Johnson, National, Collins, Hallcrafters, Gonset, Elmac, Harvey-Wells, Marrow, Central Electronics, and other leading names.

Our prices on trade-ins are realistic and down to earth. In addition where purchase is for cash with no trade-in, an additional 10% discount is allowed. Burghardt's financing plan tailored to your budget can be used for the purchase of new as well as used equipment.

73,

Stan Burghardt W8BJV

"Your confidence is our most valuable asset"



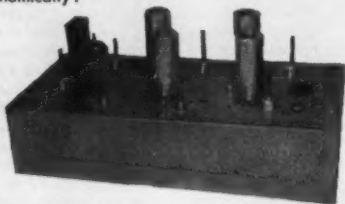
Burghardt RADIO SUPPLY

P. O. Box 746, Watertown, South Dakota • Phone 749

Tecraft

Get Going on 6 QUICKLY!
—or on 10-11, 15, 2 or 220

YOUR present receiver and this **Tecraft** crystal controlled converter will do the job—ably and economically!



Model
CCS

Any Model,
any I.F.
Complete
\$42.50

Model
CCS-50,
144 and
148 in kit
form.
\$29.75

CCS-50.....50-54 Mc.
CCS-120.....CAP Intercom.
CCS-144.....144-148 Mc.
CCS-148.....CAP Intercom.
CCS-220.....220-225 Mc.

Choose I.F. frequency—6-10, 7-11, 8-12, 10-14, 12-16, 14-18 or for COLLINS, 26-30 Mc. Model CCS-220 with I.F. 14 to 19 Mc. only. This is a Cascade model—4db noise figure. (144 Mc) Tube line up: 6BZ7, 2 6CB6, 2 6J6.

Ask your dealer or write us

THE EQUIPMENT CRAFTERS, INC.

523 Winne Ave. Tel. Colfax 2-0159 River Edge P.O., N. J.



There are fifteen township report centers, each requiring communications. This is the Elma Township station. The operator is K2DJN.

amateur radio operators would the success of this program be insured. Today, two years later, it can honestly be said that the local amateur radio operators in Erie County have more than justified the faith the Erie County Board of Supervisors put in them when they authorized the expenditure of \$57,000 for the equipment to outfit all of the RACES installations in the county. We have a total of 167 licensed amateur radio operators enrolled in civil defense and cleared in accordance with RACES regulations. There are more amateurs signing up each day and it is hoped that eventually every amateur in Erie County will be actively participating in the RACES program.

Operation Cue

(Continued from page 47)

during the Operation Cue program. It takes more than two weeks of concentrated study to absorb more than a smattering of information on atomic energy, but most of us observers felt we had in that two weeks picked up far more atomic energy information than the average person will get in his lifetime. It was an experience we'll never forget. And spectacular as it was, the explosion itself was only, as FCDA's Harold Goodwin put it, the attraction to get us out there to attend the briefings. The pre-shot and post-shot visits to the test area were as important as the witnessing of the shot itself, if not more so. ARRL was present, not only in the person of ourselves, but in the persons of the many other amateurs who attended and took part.



EASY TO BUILD!

Self Supporting
STEEL TOWERS

For Rotary Beams, FM, TV

You can erect this tower yourself. Just dig four holes, set anchor posts in place, bolt the pieces together. 5 1/2 ft. ladder sections make it easy to work higher as tower goes up. It's a lot of fun to build your own tower—and saves you money, too!

ATTRACTIVE—NO GUY WIRES!

- 4-Post Construction for Greater Strength!
- Galvanized Steel — Will Last a Lifetime
- SAFE — Ladder to Top Platform
- COMPLETE — Ready to Assemble
- Withstands Heaviest Winds

SMALL DOWN PMT.—EASY TERMS

Width of
Base Equal
to 1/5 Height

Vesto Towers are available in a wide range of sizes to meet requirements of amateurs and commercial users alike. Note the low prices for these quality lifetime towers: 22'-\$104, 28'-\$127, 31'-\$149, 39'-\$182, 41'-\$208, 50'-\$239, 61'-\$299, 100'-\$895.

Towers are shipped to your home knocked down, FOB Kansas City, Mo. 4th class freight. Prices subject to change...so order now! Send check or money order...or write for free information. Cable address: "VESTO"

WRITE TODAY
FOR COMPLETE
FREE INFORMATION
AND PHOTOGRAPHS

VESTO CO., Inc.
20th and Clay
North Kansas City, Mo.

Strays

K2HAM and W2EGG live in Brooklyn, N. Y.

LAFAYETTE'S SPECTACULAR MONEY SAVERS

Argonne

TRANSISTOR TRANSFORMERS

AT LAST A COMPLETE LINE OF QUALITY TRANSFORMERS FOR EVERY TRANSISTOR APPLICATION AT A PRACTICAL PRICE!

2.75 each
Lots of 10 Assorted
2.95 Singly, each

Nickel-Steel and Silicon Steel Laminations Wound on Nylon Bobbins. Mylar Outer Wrap & Color Coded Leads. Have you been experimenting with transistor circuits? And have you been forced to make-do with compromise transformers or improvised units? And have you had to pay from \$6.00 to \$12.00 for them? The Argonne line brings you a wide variety for experimentation as well as for replacement. Efficiently designed to meet the needs of miniaturization and engineered to provide more power handling capacity and improved frequency response with minimum distortion. All are nickel-steel laminations except Asterisk which are silicon steel. Average net weight 1 1/4 oz. average shipping wt. 4 ozs.

Argonne Number	Type	Impedance Primary Ohms	Secondary Ohms	Unbalanced Current Pri. D.C. MA	D.C. Resistance Pri. Sec. Ohms	Overall Size
AR-100	Input	200,000	1,000	.0	3600	90
AR-101	Input	100,000	5,000 CT	.5	3600	60
AR-102	Input	100,000	1,500 CT	.5	3600	40
AR-103	Driver	20,000	2,000 CT	1.	400	50
AR-104	Driver	20,000	1,000	.0	400	50
AR-105	Driver	20,000	400	1.	600	30
AR-106	Driver	15,000	4,000	1.	620	350
AR-107	Driver	15,000	200	1.5	1000	20
AR-108	Driver	10,000	3,000 CT	.0	200	100
AR-109	Driver	10,000	2,000 CT	.0	500	50
AR-110	Output	10,000	25	2	600	2.5
AR-111	Output	5,000	100	1	600	10
AR-112	Output	3,500	200	1	120	25
AR-113*	Driver	3,000 CT	1,000	.9	100	60
AR-114	Output	2,500	11	10	.50	.1
AR-115	Input	2,000 CT	8,000 CT	.0	150	600
AR-116	Output	2,000	200	4.	120	20
AR-117	Output	500 CT	20	.0	20	1.5
AR-118	Output	500 CT	15	.0	20	1.5
AR-119	Output	500 CT	3.2	.0	20	.3
AR-120*	Output	400 CT	11	1.	20	.9
AR-121*	Output	300 CT	3.2	.0	20	.25
AR-122*	Output	250 CT	3.2	.0	11	.3
AR-123	Input	200	2,000 CT	2.	11	100
AR-124*	Output	200 CT	16	.0	20	1.3
AR-125	Input	3	4,000	.0	.14	50

NEW



TRANSISTOR
TYPE 2N107
P-N-P



\$1.25

RAYTHEON
TRANSISTORS
SALE!

CK-722
RAYTHEON

CK-722—Singly, each..... 2.10
—In lots of 10, each..... 1.95
CK-721—Singly, each..... 2.40
—In lots of 10, each..... 2.25

High Output
Dynamic
Microphone



List Price
\$47.00
\$12.95
High quality Dynamic microphone exceptionally fine for Public address recording, etc. Flat response 60-10,000 cps. Impedance 40,000 $\pm 15\%$ at 1,000 cps output level —55 db. Die cast metal case equipped with 6 ft. of shielded cable. Shpg. wt. 3 lbs.
PA-19—in lots of 3 12.45
singly, ea. 12.95

TOP QUALITY
CRYSTAL
MICROPHONE



COMPARE IT WITH
ANY MIKE AT 2 to 3
TIMES THE PRICE
A quality crystal Microphone for PA systems, house recorders, etc. Frequency response 30 to 10,000 cycles Output level —52 db. Provides ample output for use with low gain amplifiers. Complete with 5 ft. of shielded cable. Shpg. wt. 3 1/2 lbs.
PA-24—in lots of 3 **\$3.95**
singly, each 4.25

LAPEL
MICROPHONE



• REGULAR \$14.00 VALUE!
• FULL —55 db. OUTPUT LEVEL!
• IDEAL GENERAL PURPOSE MIKE!
2.95
Specially engineered crystal Microphone. Attaches to lapel. Only 1 1/2" in diameter. Exceptional frequency response. Output level —55 db. chrome plated case and clip for attaching to lapel. Includes 5 ft. of shielded cable. Shpg wt. 1 lb.
PA-18 2.95

MAKE YOUR OWN
PRINTED CIRCUIT
NOTHING ELSE TO BUY!



Our Inexpensive Etched-Wire Kits Contain: Laminated Copper Boards (XXX-P); Printed Circuit Tube Sockets; Copper Etching Material and Instructions; Etch-resistant material for Circuit layouts; Eyelets and drill for connections; Sealed Layout Sheets for making your own or standard Printed Circuits. All Kits Are Supplied with Plastic Case

5001P—BASIC KIT
Contains a complete assortment of materials needed to make a variety of different Printed Circuits. Circuit Diagrams include Multimeter and J-tube Receiver.
Only **\$3.95**

5003P—SERVICEMAN & TECHNICIAN'S KIT
Contains three times the material of Kit 5001P with special Sockets, Connectors and double-faced Copper Boards.
Only **9.75**

5004P—PRODUCT DESIGNER'S KIT
This special Kit enables the Manufacturer and Laboratory to make a pilot run of etched wire Printed Circuits with his own staff and facilities. Contains all the latest information, materials and methods for adapting your product to mass production techniques.
25.00

REMOTE CONTROL FOR
SILENT TV VIEWING

The hard-of-hearing can listen to radio or TV without turning the volume so high that others can't stand the noise. They can listen with loud speaker cut off, or if others want to listen, with normal speaker volume. Excellent for noisy programs. Let the Kids listen and view with speaker cut off. Comes complete with miniature phone, fits snugly in ear, 20 feet of cable and instructions.

• For Hard-of-Hearing
• For Late Listening



6.50

MS-125 6.50
TWO CAN LISTEN
WITH ADDITIONAL
EAR PHONE 1.95



TRANSISTOR 455KC I.F. 1/2"x1/2"x1/4" H
89
This tiny I.F. is the same as used in the transistorized sets of the leading manufacturers. Ideal for building miniature equipment.
MS-126—Single, each..... 89c
In lots of 10, each..... 79c

Write for FREE Bargain Packed Catalog!
Lafayette Radio
DEPT. VH
Include postage with order
NEW YORK, N.Y. 100 Sixth Ave.
BRONX, N.Y. 542 E. Fordham Rd.
NEWARK, N.J. 24 Central Ave.
PLAINFIELD, N.J. 139 West 2nd St.
BOSTON, MASS. 110 Federal St.

Universal Mobile Antenna Fittings

By K-W ENGINEERING WORKS

The parts you've been looking for . . .

All K-W 'UNIVERSAL' fittings to which tools are applied are hexagonal to fit standard wrenches . . . All are nickel-chrome plated . . . All have standard 3/8-24 S.A.E. threads . . .

BASE/EXTENSION SECTIONS—Light weight . . . low wind resistance . . . fabricated from sturdy 3/8" steel tubing . . . special Jam Nut, one supplied with each section, permits removal of parts without damage to finish . . .

6"	\$1.75	24"	\$3.50
12"	2.35	30"	4.05
18"	2.95	36"	4.55

Additional JAM NUTS each \$0.15

COUPLING—
Female threads
thru. \$0.75

COLLET—For plain-end 3/16" Dia. antenna rods . . . used to provide adjustable height or to resonate antenna . . . fits any extension listed. \$2.35

STUD—Male threads both ends with solid hex for wrench. \$0.90

WHIP-HOOK—Solid brass nickel-chrome plated . . . fastens to rain molding with set screw. \$1.00

K-W's "DYNA-Q" LOADING COIL—Highest efficiency base or center loading . . . handles over 100-watts without arcing . . . one coil operates all bands 10-thru-75 . . . unshielded . . . all power radiated. \$14.95

AT YOUR JOBBERS'—Circulars on request

K-W ENGINEERING WORKS

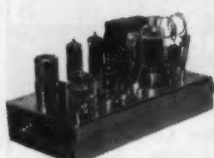
3145-A North 48th Street • Milwaukee 16, Wisconsin

TWO METER

TRANSMITTER • CONVERTER

Area of the Base is 58% of the size of this Page

Area of Base is 68% of the size of this Ad.



LW-50—

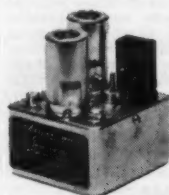
Fixed or Mobile

- 15 Watt Transmitter
- Crystal controlled
- Speech for Crystal or Carbon Microphone
- Push-pull Modulators with Speech Clipping
- Pre-assembled Kit
- LW-50K \$34.50
- Wired and tested
- LW-50 \$54.50
- Crystals \$2.00
- 6 Tubes \$10.50
- AC Power Supply \$29.95

- Crystal Controlled Converter
- 7-11, 14-18 Mc or BC output
- BC IF for Mobile or Nets
- Only 5 ma total B+ drain
- Completely wired and tested with tubes, crystal and coax plugs.

LW-61
\$18.50

Postpaid



See QST May '54, pp. 47-48 or write for literature.

ELECTRONIC LABORATORY
ROUTE 2, JACKSON, MICHIGAN

QST—Vol. IV

(Continued from page 40)

including Canada. These stations will send at 11:30 P.M. their own local time. . . .

In Volume VI, at 11, May 1923, the short-wave "CQ Party" was reported as being a "decided success." Receipt of many logs was mentioned; and QST stated that "surprising distances on surprisingly low waves were recorded." The details were shown on pages 75 to 76, May 1923, under "Calls Heard." Logs were received from every district except the seventh. The range of wavelengths represented in the reports ran from 80 to 190 meters.

One result of some unspecified League test conducted in 1923 was later recorded in a head-note affixed to an article by Dunmore, reporting some of the work done by the Bureau of Standards in the short-wave region. (See 75 to 77, July 1923, which is also in Volume VI):

. . . Attention is also invited to the fact that in our short-wave tests 6GI with a 5-watt tube set dropped to the supposedly impractical wave of 125 meters and on both nights of the test put a roaring signal into every state in the Union. . . .

On the night of November 27th, 1923, transatlantic amateur communication was first accomplished. A wavelength of 100 meters was used. Station IMO, at West Hartford, Connecticut, with Traffic Manager Schnell at the key, worked French 8AB (Leon Deloy, of Nice, France). Shortly afterward, on the same night, John L. Reinartz (1XAM, ex-1QP, of South Manchester, Connecticut) also worked 8AB. All three stations used transmitting circuits devised by Reinartz. (On all of this, see Volume VI of QST, at 9 to 12, January 1924; and 26 to 27, January 1924).

Thereafter, there was no doubt in any amateur's mind that the use of waves around 100 meters in length, or even shorter, *possessed DX capabilities*; and that the reward arising from their use would be long-distance two-way communication with low power and not simply temporary relief from QRM. *The lure of DX work was irresistible*; and amateur developments in the short-wave field followed very quickly—both as to transmitting and receiving equipment.

S.B.Y., W0C0

R. R. 3, Box 94
Wayzata, Minnesota

Strays

The amateur fraternity is saddened to learn of the death of F. Dawson Bliley, W3GV, ex-W8GU. Mr. Bliley had been active in amateur radio since 1920 and was the founder and president of the Bliley Electric Company. In addition to being a QST author, W3GV was highly active in v.h.f. circles. He was a pioneer of the 1 1/4-meter band and for some time held the 2-meter DX record.

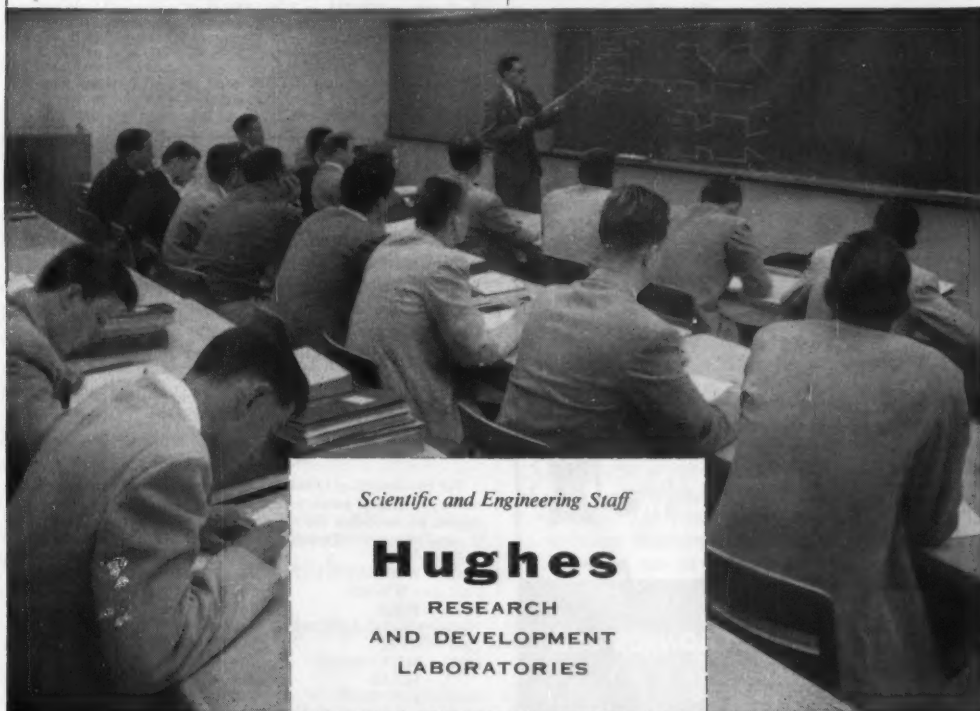
Apply Your Electronics Experience

ENGINEERS AND
PHYSICISTS WITH
ELECTRONICS TRAINING
ARE NEEDED TO
CONDUCT CLASSROOM
AND LABORATORY
PROGRAMS ON ADVANCED
SYSTEMS WORK IN THE
FIELDS OF RADAR
FIRE CONTROL.
ELECTRONIC COMPUTERS,
GUIDED MISSILES.

The proper functioning of the complex airborne radar and computer equipment produced by Hughes requires well-trained maintenance crews in the field.

At Hughes Research and Development Laboratories in Southern California engineers assigned to this program are members of the Technical Staff. As training engineers they instruct in equipment maintenance and operation for both military personnel and field engineers.

Prior to assignment, engineers participate in a technical training program to become familiar with latest Hughes equipment. After-hours graduate courses under Company sponsorship are available at nearby universities.

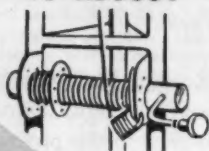


Scientific and Engineering Staff

Hughes
RESEARCH
AND DEVELOPMENT
LABORATORIES

Culver City, Los Angeles County, California

TELESCOPES CRANK DOWN TO ADJUST



The answer to your prayer — crank it up or down. Used by hundreds of hams — testimonials available. Stop it at any height 20 to 40 ft. Lower it for storms. Hinged bottom. Install it yourself. SPRING LOADED RACHET WINCH can be padlocked. Good looking, husky, yet light. 3/4 in. aircraft steel. Hoist cable tested for 920 lbs.

\$53.50 FOB St. Petersburg

Packed in strong shipping carton.

Tele-Vue TOWERS INC.

701-707 49th ST. SO. ST. PETERSBURG, FLORIDA



CHECK with ARROW for a BETTER BUY!

Cased Filter Choke

4HY 250Ma.

List Price.....\$10.45

Special Sale Price.....\$1.98

Mobile Whip Clip Chrome Plated

Easy to install. No holes to drill.

Sale Price.....\$1.79

Westinghouse 807 Tubes

Brand New

Shipping wt. 1 lb.

Special Price.....\$1.27

F1 Carbon Chest Mike

With switch. FB for mobile use. Complete with straps. Shpg. wt. 2 lbs.

Special Price.....\$1.98

Please include sufficient postage for shipping. Any overpayment will be refunded.



ARROW ELECTRONICS INC

65 Cortlandt Street, N. Y. 7, N. Y.
Dlgy 9-4714

Arrow Hempstead - 215 Front Street
Vanhoe 1-1826

How's DX?

(Continued from page 63)

band quite a bit in search of WN/KN QSOs. However, Dan transmits on 7025, 7039 and 7065 kc., somewhat far afield to be spotted by Novices. On your mark for the 4th LABRE (Brazil) DX Contest scheduled for the first and second week ends of next month, c.w. and 'phone, respectively, 0001 GMT, Saturdays, to 2400, Sundays. The usual six-digit (c.w.) and five-digit ('phone) serials will be exchanged — RST001, RST002, etc. — and all bands 80 through 6 meters may be used. Scoring: Contacts between stations (a) in the same country count zero points but add the multiplier; (b) of different countries, both outside the American area, count one point each; (c) of different countries within the American area count two points each; and (d) in the American area and stations in the rest of the world count three points each. The "American area" is that compassed by LABRE's WAA Award Countries List and is synonymous with North and South American countries listed on the ARRL DXCC Countries List. Multipliers designated are one per band for each American area country worked, and one per band for each Brazilian call area (PY1 through PY9) worked. For final score multiply contact points gained on all bands by the number of multipliers gathered on all bands, A1 only or A3 only. (The same station can be QSO'd on different bands.) As discerned from valid logs postmarked no later than November 30th, the LABRE Contest Commission, Caixa Postal 2353, Rio de Janeiro, will award 1st- and 2nd-place certificates to multiband and single-band high scorers in each country and in each Brazilian call area. See you on the north-south path, amigos!

Hereabouts — HP1EH was prepared to have some rare fun in July but didn't get much chance. In error Louis was issued the call HO1EH, Panama authorities caught the switch before QSLs were printed. TI9MHB's QSL brought W2QHH back into a magic circle. Howy has 229 postwar countries worked and 229 confirmed, a rare 100-per-cent situation, indeed. W2QHH also has worked 282 different KP4s and has a confirmation from each. Incidentally, Howy picked off a French Saint Martin station in 1947, got the pasteboard, and now is one of the few who have this new ARRL Countries List addition verified. Speaking of St. Martin and other hard-to-bag Caribbean areas, several prominent DX personalities now are on the prowl down that way with portable stations. Other straws in the DX wind: Gough Island, near Tristan da Cunha (G3HPM as ZD9AD), the Comoros (Madagascar FB8s), Vatican State (numerous aspirants), Rhodes (SV8WU and others), and Tonga (VR2BZ). Watch out for a rare sleeper or two! KL7ZG hooked FLE on May 24th, VQ4EU on the 25th, and believes these QSOs to be the first KL7-Europe and KL7-Africa contacts on 15 meters. Any KL7 comments to the contrary?

Harmonics

(Continued from page 45)

rig is built from QST or Handbook plans, you might write to ARRL. However, since ARRL has not tried and tested the rigs described in contributed articles, you will probably save time by writing directly to the authors of such articles, whose addresses appear in the author's footnotes.

Good hunting, OM, and be careful to stay in the bands!

Appendix

For the benefit of Official Observers and others interested in the problem of amateur harmonics in the 7350 - 7500-kc. region, we list below the calls and frequencies (approximate) of some commercial marker stations heard in this region.

7345 — OFB77	7437 — HBX
7347 — WWL53WWK47	7442 — HBP3
7362.5 — WWB27	7447 — HBX/HBP3
7367 — TQQ3	7475 — EDX
7393 — OEO27/OET30**	7477 — GFV18/22/24
7395 — OFB77	7480 — EES
7407 — MKS2/MKS3/ MKS4	7484 — VFG
7415 — WEO57A2	7485 — DGG481**
7427 — AT & T (N. Y. C.)*	7486 — AT & T (N. Y. C.)*

* Single-sideband type signal.

** Frequency-shift Morse signal.

The Indian sang his death song



100 YEARS AGO, during a frontier skirmish, an Indian brave, singing his own death song, charged down on a young officer. Lieutenant George Crook, 4th Infantry, coolly fell to one knee, carefully aimed, and dropped the brave in his tracks.

It was not Crook's first Indian, nor his last. By the time he made general, Crook was the greatest Indian-fighter this country has ever had.

Yet, he was also one of the best friends the Indians have ever had. For he understood them well, dealt fairly and firmly, and always kept his promises.

When Crook died, Indians wept. And a Sioux chief named Red Cloud said: "He never lied to us. His words gave the people hope."

No nation can ever have enough men like George Crook. But America had, and still has, a lot of them. That's important to remember. Because it is a wealth of human character rather than a wealth of money that gives America its real worth. Just as it is the Americans, all 160 million of them, standing behind our country's Savings Bonds, who make these Bonds one of the world's finest investments.

For your sake—and America's—why not take advantage of this fact? Invest in—and hold—United States Savings Bonds.



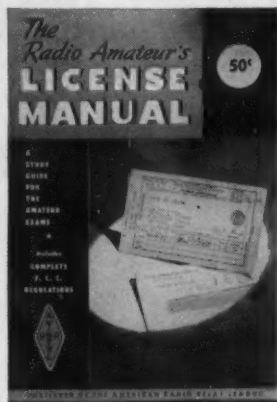
It's actually easy to save money—when you buy United States Series E Savings Bonds through the automatic Payroll Savings Plan where you work! You just sign an application at your pay office; after that your saving is done for you. And the Bonds you receive will pay you interest at the rate of 3% per year, compounded semiannually, for as long as 19 years and 8 months if you wish! Sign up today! Or, if you're self-employed, invest in Bonds regularly where you bank. There's no surer place to put your money, for United States Savings Bonds are as safe as America!

Safe as America — U.S. Savings Bonds

The U. S. Government does not pay for this advertisement. It is donated by this publication in cooperation with the Advertising Council and the Magazine Publishers of America.



UP TO DATE . . .



ALL the dope between two covers . . . complete and easy to understand

- NOVICE • CONDITIONAL
- TECHNICIAN • GENERAL
- EXTRA-CLASS

PRICE **50¢** POSTPAID

THE AMERICAN RADIO
RELAY LEAGUE, Inc.
West Hartford 7, Conn.

WANTED! Amateur or govt. surplus receivers, transmitters, test equipment, teletype, Boehme, manuals; such as ART-13, ARN-7, ARC-1, APR-4, 75A, 32V, BC-610, BC-614, BC-342, BC-348, BC-221, TDQ. Cash or trade for NEW Johnson Viking Ranger, B&W, Hallicrafters, Hammarlund, Harvey-Wells, National, Central El, Gonset, Elmac, Morrow, RME, Telrex, Fisher Hi Fi, Pentron, Bell, Master Mobile, Sonar, etc.

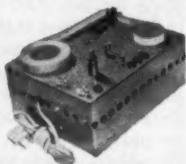
Stores: 44 Canal St., Boston, Mass. 60 Spring St., Newport, R. I.

ALLTRONICS Write or phone, Tom, W1AFN,
Richmond 2-0048 or 2-0916 Box 19, Boston 1, Mass.

What Is This Thing Called the "Hump" in CODE?

THE *hump* (around 8 words) is the thing that tells you you have wasted your time by starting out wrong. Thirty years ago when we started teaching Code our students too ran head-on into the *hump*. We went to work to find out why. TWO-PHASE, STEP BY STEP instruction is the perfect answer. In this method dotdash is not A. The SOUND resulting from dotdash is A. There is also the important factor of correct timing. If the signals are not timed correctly the resulting sound will not be correct. There are many, many things connected with proper Code instruction, many of them so small they seem inconsequential. Others are so technical that many so-called experts fail to understand them. It's a long story but I have it all written up and will be glad to send it to you. A postcard will bring you the full story.

TELEPLEX CO. 415 G. St., MODESTO, CALIFORNIA



World Above 50 Mc.

(Continued from page 58)

W6SXX, SS Hawaiian Rancher— Keeping listening schedules with various W6s on run to Hawaiian Islands. Also working KH6s on arrival there, and attempting to promote interisland work on 144 Mc.

W7JRG, Billings, Mont.— Working plenty of 50-Mc. DX, despite TVI problem from local Channel 2.

W7UKI, Marysville, Wash.— Working on 420-Mc. gear with W7TWW.

W7UZB, Seattle, Wash.— Net operating each Tuesday at 2000 PST on 145.8 Mc., available for c.d. work, traffic, general rag-chewing, or to help in getting new stations started on the band.

W9KLD, Kankakee, Ill.— C.d. Net on 145.8 Mc. operating each Tuesday and Thursday at 1900 CST. Local 2-meter activity at a high level.

W9KQK, Elmhurst, Ill.— Experimenting with double pi tank circuit for 50 Mc. and playing with 10,000-Mc. set-up similar to Feb., 1947, QST. "Experimenting's for me!"

W0MOX, Overland Park, Kans.— Would like to set up definite calling and listening schedules with western 2-meter stations. Am available for skeds at 0600 to 0645 and 1800 to 2400 CST daily.



W0ZJB....48	W5VY.....48	W9ZHB....48
W0BJV....48	W5GNO....46	W9QVU....48
W0CJS....48	W5ONS....45	W9HGE....47
W5AJG....48	W5JTL....44	W9PK.....47
W9ZHL....48	W5ML....44	W9VZE....47
W9OCA....48	W58FW....44	W9RQM....47
W6OB....48	W5FSC....44	W9ALU....47
W0INI....48	W5JLY....43	W9OKM....46
W1HDO....48	W5JME....43	W9UJA....45
W5MJD....48	W5VV....42	W9UNS....45
	W5FAL....41	W9MFH....36
W1ILL....47	W5HLD....40	
W1CLS....46	W5HEZ....38	W9QIN....47
W1CGY....46	W5FXN....38	W9DZM....47
W1GJO....45	W5LIU....37	W9NFM....47
W1LSN....44		W9TKX....47
W1HMS....43	W6WNN....48	W9KYF....47
W1DJJ....41	W6ANN....45	W9HTV....47
	W6TMI....45	W9JOL....46
W2AMJ....46	W6IWS....41	W9MVG....46
W2MEU....46	W6OVK....40	W9WKB....45
W2BYM....46	W6CCG....35	W9TJF....44
W2RLV....45	W6BWG....30	W9URQ....44
W2IDZ....45		W9HJS....43
W2FHL....44	W7HEA....47	W9PKD....43
W2GYV....40	W7ERA....47	W9PII....41
W2QVH....38	W7BQX....47	W9PKY....32
W2ZUW....36	W7FDJ....46	
	W7DYD....45	VE3AET....43
W3OJU....46	W7JRG....44	VE3ANY....42
W3NKM....41	W7ACD....43	VE1QZ....34
W3MQU....39	W7BOC....42	VE3AIB....32
W3OTC....38	W7JPA....42	VE1QY....31
W3KMY....38	W7FIV....41	VE3DER....27
W3RUE....37	W7CAM....40	XE1GE....25
W3FPH....35		CO6WW....21
	W8N8S....46	
W4FBH....46	W8NQD....45	
W4EQM....44	W8SUZ....45	
W4QIN....44	W8RFV....45	
W4FWH....42	W8CMS....43	
W4CPZ....42	W8SQU....43	
W4FLW....42	W8LPD....42	
W4QXC....41	W8YLS....41	
W4AMS....40	W8OJN....40	
W4FNR....39		
W4IUJ....38		
W4BEN....35		

Calls in bold face are holders of special 50-Mc WAS certificates listed in order of award numbers. Others are based on unverified reports.

FEED-BACK

In "Parallel 6146s in the Mobile or Fixed-Station R.F. Assembly," page 16, June QST, R₃ in the text should be two 15K 1-watt resistors in parallel (not two 1.5K resistors as listed).

Transmit-Receive ON One Antenna

WITH AUTOMATIC CHANGEOVER



Model 380

Here is fully automatic electronic antenna changeover from receiver to transmitter and *vice-versa*—Suitable for all power applications up to the legal limit. B&W's new T-R switch is ideal for voice operated SSB—AM phone and break-in CW—all with one antenna.

- Ends annoying antenna changeover relay clatter
- Lets you select one antenna for receiving and transmitting—automatically
- You get actual signal gain from 1 mc to 35 mc
- Broad band—no tuning or adjustments
- Fail-safe device protects final amplifier, low-pass filter, shielded link—antenna load is always coupled to transmitter
- Power loss virtually unmeasurable
- Operates with either 52 or 75 ohm coax line
- Compact—completely self-contained

See it at your distributors' or write for literature



BARKER & WILLIAMSON, INC.

237 Fairfield Avenue • Upper Darby, Pennsylvania

RADIO COURSES

- FCC LICENSE PREPARATION
- COMMERCIAL
- AMATEUR
- CODE BRUSH-UP
- THEORY
- TELEVISION AND RADIO SERVICING

Personal Counseling Approved for Veterans

YMCA TRADE & TECHNICAL SCHOOL of N. Y.

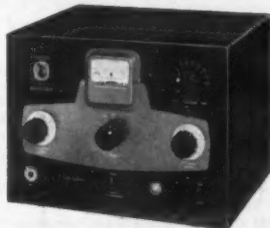
15 West 63 St. New York 23, N. Y.
EN 2-8117

Catalog T. O.



53rd Year

VIKING ADVENTURER



Single-knob bandswitching 80 through 10 meters. Rated at 50 watts input and effectively TVI suppressed. Self-contained power supply is wired for use as an "extra" station power source when transmitter is not in use. Clean, crisp break-in keying.

SELECTRONIC SUPPLIES, INC.

Radio and Electronic Supplies

1320 Madison Ave., Toledo 2, Ohio, W8GD, Mgr.
803 South Adams St., Peoria 2, Ill., W9YM, Mgr.

Good until Sept. 30th, ONLY

SPECIAL OFFER

FT
243



TO INTRODUCE
OUR PRODUCT
MORE WIDELY

**NOT
SURPLUS**

Limited to fundamental frequencies in the three, seven and eight megacycle bands. Large assortment means we can select your requested freq. plus or minus one kilocycle.

ORDER DIRECT

A PROFESSIONAL
CRYSTAL AT AN
AMATEUR PRICE

\$2.00
POSTPAID

E. B. LEWIS CO.

11 BRAGG STREET
EAST HARTFORD 8, CONNECTICUT

quality control
SYSTEMS ENGINEERING
component design
ENVIRONMENTAL ENGINEERING
coordination
RESEARCH
production engineering
DEVELOPMENT packaging

Regardless of which is your ultimate objective, the broad practical experience you get in FIELD ENGINEERING will supplement your theoretical training, prepare you to meet the challenge of the future and put you years ahead!

RAYTHEON FIELD ENGINEERING

is diversified. Radar, Sonar, Guided Missiles, Computers, Microwave and other specialized equipments offer an outstanding opportunity to qualified men to earn excellent salaries while working among authorities in these fields. Your performance regulates your progress. Liberal insurance and retirement plans. Generous travel allowances and other benefits. Grow with a growing organization. Write now:

RAYTHEON MANUFACTURING CO.

Government Service Department
100 River Street • Waltham 54, Massachusetts

AN/APR-4 COMPONENTS WANTED

In any condition. NEW HIGH PRICES. Also top prices for: ARC-1, ARC-3, APR-1, APR-5A, etc.; TS-34 and other "TS-" and standard Lab Test equipment, especially for the MICROWAVE REGION; ART-13, BC-348, BC-221, LAE, LAF, LAG, and other quality Surplus equipment; also quantity Spares, tubes, plugs and cable.

ENGINEERING ASSOCIATES

434 Patterson Road Dayton 9, Ohio



Founded in 1909

**RADIO TELEPHONY
RADIO TELEGRAPHY
RADAR & TELEVISION**

Courses ranging in length from 7 to 12 months. Dormitory room and board on campus for \$48.00 a month. The college owns KPAC, 5 KW broadcast station with studios located on campus. New students accepted monthly. If interested in radio training necessary to pass F.C.C. examinations for first-class telephone and second-class telegraph licenses, write for details New: Advanced TV Engineering Course.

PORT ARTHUR COLLEGE **PORT ARTHUR TEXAS**

Approved for G. I. training

Happenings

(Continued from page 60)

and for vice-director but members are urged to interest themselves equally in the two offices.

League members are classified as Full Members and Associate Members. Only those possessing Full Membership may nominate candidates or stand as candidates; members holding Associate Membership are not eligible to either function.

Voting by ballots mailed to each Full Member will take place between October 1st and November 20th, except that if on September 20th only one eligible candidate has been nominated, he will be declared elected.

Present directors and vice-directors for these divisions are as follows: *Atlantic*: Gilbert L. Crossley, W3YA, and Charles O. Badgett, W3LVF. *Canadian*: Alex Reid, VE2BE, and Reginald K. Town, VE7AC. *Dakota*: Alfred M. Gowan, W0PHR, and Forrest Bryant, W0FDS. *Delta*: George H. Steed, W5BUX, and George S. Aton, W5BMM. *Great Lakes*: John H. Brabb, W8SPF, and Robert L. Davis, W5EYE. *Midwest*: William J. Schmidt, W9OZN, and James E. McKim, W0MVG. *Pacific*: Harry M. Engwicht, W6HC, and (no vice-director). *Southeastern*: James P. Born, Jr., W4ZD, and Randall E. Smith, W4DQA.

Full Members are urged to take the initiative and to file nomination petitions immediately.

For the Board of Directors:

A. L. BUDLONG
Secretary

July 1, 1955

YL News & Views

(Continued from page 63)

may be used. A card from the District of Columbia may be submitted in lieu of one from Maryland.

3) Contacts with all 48 states must be made with stations operated by licensed women operators.

4) Contacts with all 48 states must be made from the same location. Within a given community one location may be defined as from places no two of which are more than 25 miles apart.

5) Contacts may be made over any period of years provided only that all contacts are from the same location as defined in Rule 4.

6) Forty-eight QSL cards, or other written communications from stations worked confirming the necessary two-way contacts, must be submitted by the applicant to the custodian for the WAS-YL award. Sufficient postage must be sent with the confirmations to finance their return. The YLRL will not be responsible for any loss or damage to same.

Custodian for the WAS-YL award is Lou Littlefield, W1MCW, 19 State Avenue, Cape Elizabeth, Me. Only seven of these awards have been issued to date — to W1FTJ, W2QHH (OM), W3OP (OM), W4ARR (OM), W4SGD, W8HWX, and W9CMC (OM).

YLCC Award

The YL Century Certificate for confirmed contacts with stations operated by 100 or more different licensed women amateur radio operators is issued by the YLRL at no cost to the applicant upon compliance with the following rules:

1) Two-way communication must be established on the authorized amateur bands with stations — mobile or fixed — operated by 100 different licensed women amateurs. Any and all amateur bands may be used.

2) All contacts must be made from the same location. Within a given community, one location may be defined as from places no two of which are more than 25 miles apart.

3) Contacts may be made over any period of years, provided only that all contacts are from the same location as defined in Rule 2.

4) Contacts with YLs anywhere in the world are recognized provided that confirmations clearly indicate that the stations contacted were operated by duly licensed women amateur radio operators.

5) One hundred QSL cards or other written communications from the stations worked confirming the necessary two-way contacts, accompanied by a list of claimed contacts

(Continued on page 152)

NEW!

100 KC CRYSTAL CALIBRATOR

Provides accurate check points for transmitting frequency or for calibrating receivers and VFO's!

Extremely compact, this tiny crystal calibrator provides accurate 100 kc. check points to 55 mc. High quality, hermetically sealed military type crystal is superior to those usually found in a unit of this type. Circuit uses a 6BH6 tube and has an adjustable ceramic trimmer condenser for exact zero beating of the crystal to WWV or other standard.

Measuring only $1\frac{1}{8}'' \times 2\frac{1}{2}'' \times 1\frac{1}{2}''$, the chassis may be mounted inside receiver cabinet or in any convenient spot. (Overall height to top of tube is $3\frac{3}{4}''$.) Power may be taken from your receiver or other source—requires only 6.3 volts at .15 amps. and 150 to 300 volts at 2 ma. Special clips are provided for tube prongs of equipment furnishing power take-off. Power cable and extension leads are included to permit remote mounting of switch. Furnished completely wired and tested with tube.

Cat. No. 250-28 CRYSTAL CALIBRATOR

\$17.25
AMATEUR NET



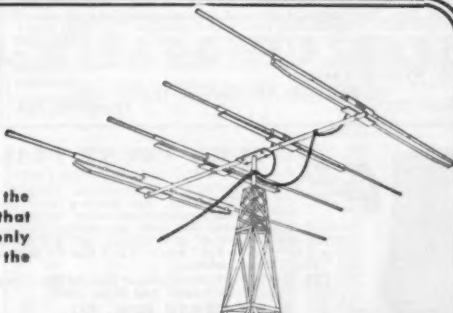
E. F. JOHNSON COMPANY

2824 Second Avenue Southwest • Waseca, Minnesota

Start Your Beam Today with C & G

You may not be thinking of anything as skookum as the array illustrated, but we urge you to start NOW on that beam you dreamed of all last winter. Summer is the only time for a project like this. Here are a few ideas for the various bands.

- | | | |
|-----------------------|--|--|
| FOR 2 METERS: | GONSET TWIN SIX BEAM
HYLITE 4 ELEMENT BEAM
HYLITE 8 ELEMENT BEAM | |
| FOR 6 METERS: | LYSCO GROUND PLANE | |
| FOR 10 METERS: | HYLITE 3 ELEMENT BEAM
LYSCO GROUND PLANE | |
| FOR 15 METERS: | Q MASTER 3 ELEMENT BEAM | |
| FOR 20 METERS: | GONSET BANTAM BEAM
MOSLEY VEST POCKET
MOSLEY VEST POCKET | VPA 20-2 ELEMENT BEAM
VPA 20-3 ELEMENT BEAM |
| FOR 40 METERS: | GONSET BANTAM BEAM
MOSLEY VEST POCKET
Q MASTER 2 ELEMENT BEAM | Q MASTER 3 ELEMENT BEAM
VPA 40-2 ELEMENT BEAM |



We stock copperweld wire and ALL types of insulators both for long wire types and beams. You may need something to hold your antenna up and rotate it so inquire about our telescoping masts and crank-up towers. We also feature the "VEST POCKET" and "SHORT DUBLET" coils for the builder.

All inquiries and catalog requests answered promptly

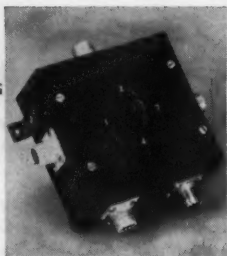
FREE One **ELECTRO-VOICE** "Second Op" with every order of antenna supplies this month.

Ask for our Used and Surplus Equipment List



2502 Jefferson
Tacoma 2, Wash

Phone
BR 3181



Four position rotary switch for coaxial cables.

Switch to any of four antennas or three antennas and dummy load.

Low SWR 1.75 to 30 Mc. 5 amps of RF in any fixed position. 1000 volt ins.

Amateur net \$5.50 kit form
\$7.50 wired & tested

MYRON ANTHONY
W9TPU

BOB VIRKUS
W9MRW

Available directly from

BLACKSTONE ELECTRIC CO Inc.

561 HILLGROVE

LA GRANGE, ILLINOIS

GET INTO ELECTRONICS

You can enter this uncrowded, interesting field. Defense expansion, new developments demand trained specialists. Study all phases radio & electronics theory and practice: TV; FM; broadcasting; servicing; aviation, marine, police radio. 18-month course. Graduates in demand by major companies. H.S. or equivalent required. Begin Jan., March, June, Sept. Campus life. Write for Catalog.

VALPARAISO TECHNICAL INSTITUTE
Dept. TN Valparaiso, Ind.



Groth

TURN COUNT DIAL

Registers Fractions to 99.9 Turns

FOR roller inductances, INDUCTION TUNERS, fine tuning gear reducers, vacuum and other multivibrator variable condensers. One hole mounting. Handy logging space. Case: 2" x 4". Shaft: 1/4" x 3". TC 2 has 2 1/4" dial — 1 1/4" knob. TC 3 has 3" dial — 2 1/4" knob. Black bakelite.

TC 2 \$3.90 — TC 3 \$4.20 — Spinner Handle 75c extra
Parcel Post Orders: Add \$4 for dial

R. W. GROTH MFG. CO.
10009 Franklin Ave. Franklin Pk., Illinois

Evans RADIO

• "YOUR FRIENDLY SUPPLIER"

- ▶ Service to hams by hams.
- ▶ Nationally accepted brands of parts, tubes and equipment.
- ▶ Trade-ins and time payments.

Write W1BFT

P.O. BOX 312

CONCORD, N. H.

which should include the full names of the operators (alphabetically arranged) and the dates and times of contacts, must be submitted by the applicant directly to the YLCC custodian. Sufficient postage must be sent with the confirmations to finance their return by first-class mail. The YLRL will not be responsible for any loss or damage to same.

6) Endorsements: Confirmations of contacts, accompanied by alphabetical list, as per Rule 5, from stations operated by additional YLs may be submitted for credit each time 50 additional confirmations are available. Endorsements will be made to the original certificate as applications are approved.

7) Decisions of the YLCC custodian regarding interpretation of these rules as here stated or later amended shall be final. All inquiries regarding cards, applications, or the certificates should be addressed to her.

W7GLK, Dot Dickey, has resigned as YL Century Certificate custodian. Please hold QSLs until the new custodian, to be appointed by the president is announced in this department next month. To date 40 YLCC awards have been issued as follows:

- | | | |
|----------------|----------------|-----------|
| 1. W1BFT (OM) | 17. W8SDD (OM) | 33. W4LAS |
| 2. W2QHH (OM) | 18. W1VOS | 34. W7ULK |
| 3. W3JSH* | 19. W0TAB | 35. W8SPU |
| 4. W8HLF | 20. W6WRT | 36. W6JZA |
| 5. W4SGD | 21. W3RXV | 37. W6FKH |
| 6. W4CKB (OM) | 22. W9OMN | 38. W4YYJ |
| 7. W3OQF | 23. W7RT (OM) | 39. W4BLR |
| 8. W7HHH | 24. W9NN (OM) | 40. W1AW |
| 9. W8ATB | 25. W2OWL | 41. W9GME |
| 10. W8HWX | 26. W8MBI | 42. W9YBC |
| 11. W4ARR (OM) | 27. W9HFP | 43. W3VLX |
| 12. W8HUX | 28. W7FWR | 44. W9LOY |
| 13. W3OP (OM) | 29. W6EHA | 45. W6PCA |
| 14. W9CMC (OM) | 30. W8QVD (OM) | 46. W5WUX |
| 15. W4KYI | 31. W6KER | 47. W8FPT |
| 16. W4VJX | 32. W6QGX | 48. K2IWO |

* Now K2DYO.

WAC-YL Award

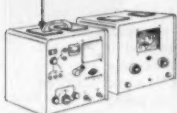
Any amateur offering proof of two-way communication with a YL operator on each of the six continents is eligible for a Worked All Continents-YL award. OM W2QHH holds the only such certificate issued to date.

Secy.-Treas. W0MMT, Marie Ellis, 608 Leaser Dr., Ft. Collins, Colo., or any of the officers given above will be pleased to furnish further details about the WAC-YL award.

Keeping Up with the Girls

W7HHH, Bea, lists the YLs who attended the ARRL Oregon State Convention at Portland: W7s ECC, FKS, FXE, HHH, ITZ, LS, NJS, NTT, QKU, QWX, QXH, RAX, RIC, RVM, SBS, SBX, SJW, SPC, SYF, UEL, ZKY, ZLT and W7s ENU, UFN, WFO, WRA, AMN, and ZNK. . . . Officers of the LARK for the new term are President Helen, W9BCA; V. P. Rita, W9YXX; Secy. Mardine, W9IWP; Treas. Evelyn, W9YWH; Publicity Chairman Peg, W9SYX; "Pinfeather" editor Adeline, W9LDK; Novice representative Blanche, W9TDC. . . . OM W3YFW writes that he and his wife WN3APT, Betty, are enjoying 80 and 40 c.w. together. Betty had her first QSO only a few hours before she gave birth to a baby girl. . . . Present at a Smorgasbord luncheon marking the final meeting of the season of the N. Y. C. YLRL were W2s EEO, EUL, IGA, IQP, QGK, MVV, OWL, QWL and Treas. Helen Zuparn. . . . New officers for the Los Angeles YLRC are President Helene W6QOG; V. P. Lorraine, W6AKE; Recording Secy. Jayne, K6GMX; Corresponding Secy. Lucille, K6EXV, and Treas. Gladys, W6DXI. In less than a year, club membership has almost doubled, with a current total of 60 YLs. . . . W9BCA and her OM participated in a TV show arranged by Hallcrafters Co. of Chicago. Helen's seeing-eye dog, curled at her feet, listened to his mistress engage in a four-station QSO on two meters. . . . YLs who gathered for an informal meeting at the Dayton Hamvention were W3UUG, W4s UDQ, WJP, W8s HPP, LGY, MVA, OSD, RVP, RZN, SPU, VWL, WN8TXL, W9JUJ and KL7BHE.

FOR COMMUNICATORS OR OTHER
LOW POWER 2 METER EQUIPMENT....



Same size and style
as Communicator....



a 10 time
increase
in output power

2 meter linear
R.F. POWER AMPLIFIER

Highlights.....

- Push-pull 826's VHF triodes with forced air cooling.
- Power supply utilizes two, 5U4GB rectifiers in a husky, voltage-doubling circuit.
- Built-in antenna changeover relay.
- Operates as a linear amplifier. Delivers AM signal of 50-60 watts carrier with only 4 to 5 watts drive.
- Available for aircraft and other commercial and governmental frequencies on special order.
- Can operate readily with 2 meter equipment of other manufacture.

Communicator owners everywhere are fast joining the "Big signal" ranks by installing this effective, economical 2 meter linear amplifier. Here is a typical Gonset "VHF Power Package", carefully engineered for dependable, simplified operation. Requires mere minutes from installation to top, on-the-air performance...

AT 50 to 60 WATTS OUTPUT

Net....149.50

AT YOUR DISTRIBUTOR

Complete with tubes

GONSET CO.

801 South Main Street, Burbank, Calif.

MAMMOTH CRYSTAL CLEARANCE SALE!

Save Money—Order in
Package Quantities!

Shipment made same day order received.
All crystals tested and guaranteed to
oscillate. Please include 20¢ postage for
every 10 crystals or less. Minimum order
\$2.50. No. C.O.D's.

PACKAGE DEAL No. 1

25 Assorted FT-243 45 Assorted FT-241A
15 Assorted FT-171B 15 Assorted CR-1A

100 Crystals \$8.95

Assorted.....Regular value \$66.00

PACKAGE DEAL No. 2

FT-241A Crystals for Single Sideband
370 KC-538 KC

35 Crystals \$3.49

Assorted.....Regular Value \$14.00

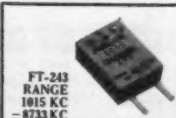
PACKAGE DEAL No. 3

HAM BAND CRYSTALS—FT-243

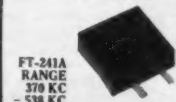
For operating on 80, 40, 20, 15, 10, 6 and
2 meters—on either fundamentals or
harmonics.

25 Crystals \$6.95

Assorted.....Regular Value \$20.00



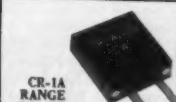
FT-243
RANGE
1015 KC
- 8733 KC



FT-241A
RANGE
370 KC
- 538 KC



FT-171B
RANGE
2030 KC
- 3995 KC



CR-1A
RANGE
5910 KC
- 7930 KC

INDIVIDUAL CRYSTALS • Indicate 2nd choice—Substitution May Be Necessary
Low Frequency—FT-241A for SSB, Lattice
Filter etc., .003" Dia., .486" SPC, marked in
Channel Nos. 0 to 79, 54th Harmonic and
270 to 300, 72nd Harmonic. Listed below by
Fundamental Frequencies, fractions omitted.

49¢ each—10 for \$4.00 79¢ each—10 for \$6.50

370 393 414 483 506 529	480 450
372 394 415 484 507 530	440 461
374 395 416 485 508 531	441 462
375 396 418 487 509 533	442 463
376 397 419 488 511 534	444 464
377 398 420 490 512 536	445 465
379 401 422 491 513 537	446 466
380 402 423 492 514 538	447 468
381 403 424 493 515	448 469
383 404 425 494 516	450 470
384 405 426 495 518	451 472
385 406 427 496 519	452 473
386 407 431 497 520	453 474
387 408 433 498 522	454 475
388 409 435 501 523	455 476
390 411 436 502 525	456 477
391 412 438 503 526	457 479
392 413 438 504 527	458 480

79¢ each—10 for only \$6.50

CR-1A SCR 522-1/2 FT-171B—BC-410
Pin. 1/2" SP Banana Plug. 1/2" SPC

5910 7350 2830 2220 2380 3282 3850	
6370 7380 2845 2258 2390 3215 3945	
6450 7390 2865 2280 2415 3237 3955	
6470 7400 2883 2282 2435 3250 3995	
6497 7580 2105 2290 2442 3322	
6522 7810 2125 2380 2532 3510	
6547 7930 2145 2385 2545 3529	
6610 2155 2320 2557 3550	

TO 34A CODE KEYER
AUTOMATIC CODE PRACTICE
SENDING AND KEYING OSCIL-
LATOR

115 or 230 V @ 50-60 cycles. Portable.
Built-in speaker and amplifier. Variable
speed from 5 to 25 w.p.m. Uses inked tapes.
Brand new. **\$19.95**

FT-243—.003" Dia.—.486" SPC

49¢ each—10 for \$4.00

4035 5385 5882 6700 7575 7850	
4080 5397 5900 6706 7583 7873	
4165 5435 5906 6725 7600 7875	
4190 5437 5925 6740 7606 7900	
4280 5485 5940 6750 7625 7906	
4330 5580 5955 6773 7640 7925	
4340 5582 5973 6775 7641 7940	
4397 5660 6206 6800 7650 7950	
4445 5675 6225 6825 7660 7975	
4450 5677 6240 6850 7673 8240	
4480 5700 6250 6875 7675 8250	
4495 5706 6273 6900 7700 8273	
4535 5740 6275 6925 7706 8280	
4695 5750 6300 6950 7710 8300	
4735 5760 6306 6975 7725 8306	
4840 5773 6325 7450 7740 8310	
4852 5775 6340 7473 7750 8316	
4930 5780 6350 7475 7766 8320	
4930 5780 6373 7500 7773 8325	
5030 5840 6375 7506 7775 8630	
5205 5850 6400 7520 7800 8683	
5295 5852 6406 7525 7806 8690	
5365 5863 6425 7540 7825	
5327 5875 6473 7550 7840	
5380 5880 6475 7573 7841	

79¢ each—10 for \$6.50

7015 6100 6540 7150 8150 8580	
3655 6106 6550 7250 8173 8525	
3680 6125 6573 7300 8175 8550	
3735 6140 6575 7306 8390 8558	
3800 6150 6600 7325 8225 8566	
3885 6173 6606 7340 8340 8575	
3940 6175 6625 7350 8350 8583	
3990 6185 6640 7375 8360 8600	
6000 6300 6650 7400 8370 8625	

Sun
PARTS DISTRIBUTORS, LTD.

514 TENTH ST.
N.W., Wash., D. C. Dept. Q.

CRYSTALS

MADE TO YOUR ORDER NO SURPLUS MATERIAL

TYPE FT-243

Fabricated to U. S. Gov't Spec's
Any Frequency 3000 KCS. to 9000 KCS.

* C.D. OFFICIALS NOTE

WHY PAY MORE?

FOR EXACT FREQUENCY

.02% Toler. \$1.25 ea.
.01% Toler. 1.50 ea.
.005% Toler. 2.75 ea.

DISCOUNTS { 2 of same frequency less 10%
5 of same frequency less 15%
10 of same frequency less 20%

Note: Payment in full with order, cash or money order. All shipments postpaid. Std. warranty.

POLYTECH DEVICES INC.

1184 E. Grand St. Elizabeth, N. J.

* Civil Defense

MAKE PRINTED CIRCUITS

Give your work a neat, professional look with compact, printed circuitry! New, **CONTROL CIRCUITS** "Kit No. 1" contains all materials needed to make several commercial-size printed circuits. Easy to follow instructions and circuitry design pamphlet included. Money back guarantee.

"Kit No. 1" ONLY \$3.95 postpaid

CONTROL CIRCUITS

P.O. Box 126

Rockfall, Conn.



RCA INSTITUTES, INC.

A Service of Radio Corporation of America
350 West 4th St., New York 14, N. Y.

OFFERS COURSES
IN ALL TECHNICAL PHASES OF
RADIO, TELEVISION, ELECTRONICS

Approved for Veterans
Write Dept. ST for Catalog

HALLICRAFTERS HEADQUARTERS

S-94 30-50 Mc., S-95
152-173 Mc. Super
sensitive. Built-in relay
squelch system. Phone
tip jacks.
Ham net S-94 or S-95
\$59.95



S-95 S-94

C & G Radio Supply Company

2502 Jefferson
Inglewood, Calif.

Phone
RE 7-111

HAMFEST CALENDAR

ALABAMA — The North Alabama Hamfest will be held this year on Sunday, August 28th, in the Tri-Cities — Florence, Sheffield, Tusculumbia. Something planned every minute. You are welcome to yak and chew the rag with your old buddies, but if you want entertainment it will be there. Ask the fellow who came last year to Decatur! He'll be back! Phil Lawrence, W4DGN, P. O. Box 9, Decatur, Alabama, is the ticket man. \$1.00 attendance, meal tickets available.

ARIZONA — The Ft. Huachuca Amateur Radio Club will sponsor a hamfest at the Army Electronic Proving Grounds on September 3rd, 4th, and 5th.

The Army air strip will be available for civilian planes, but it will be necessary to sign a waiver releasing the Army from responsibility; 5/10/5 insurance desired if possible. Overnight camping facilities available. Motels are also nearby. There will be activities for the XYLs and children. Some playground facilities are at the picnic area.

IDAHO — The annual WIMU Hamfest will be held August 5th, 6th, and 7th at Big Springs, Idaho. The registration this year is expected to exceed 250. Rex Roberts, W7CPY, the Northwestern Division Director, will be in attendance, and a large number of radio clubs in the four-state area will be represented. For further info contact W7BAR.

ILLINOIS — Sunday, August 14th at Mance Park, ¼ mile east of Route 45 and ¼ mile south of Route 66 (Stinson Airport) the 21st Annual Picnic and Airmobile Meet of the Hamfesters Radio Club. The friendliest get-together in the Midwest. Planes can home in on WTAQ frequency 1300 kc. Four towers at this radio station are 190 feet tall. Planes parked free, but pilots must bring their own tie-downs. Food, ice cream, and beverages available. Games and contests for kiddies and grown-ups. Plenty of tables and free parking. Donations are \$1.00 in advance and \$1.25 at the gate. Tickets available from Jesse P. Markham, W9YNN, 37 No. Lotus, Chicago 44, Ill.

INDIANA — The Tri-State Amateur Radio Society will hold its 9th annual Hamfest on Sunday, August 28th, at Bowers Grove which is located 8 miles north of Evansville and 2 miles west of Grumpy Pals on Highway 41. There will be large signs posted along the highway and there will be transmitters on 10 and 75 meters to direct all comers to the grounds which will have plenty of shade and a screened-in shelter house. The activities will start at 10 A.M. CDST with games and contests for all members of the family. A basket dinner will be held at noon with refreshments available on the grounds. The registration fee will be \$2.50 per person. For other info, contact Callie Jones, W9UHV.

MAINE — The Annual Hamfest will be held at Stevie's, W1BOK, August 14th, at Dexter in the heart of Maine. The usual good feed will be served at noon. A dual mobile hunt with two hidden transmitters will be the feature of the day. Group meetings will be held during the day for various nets, such as Drag Net, Barnyard Net, Sea Gull Net, etc. This is the only large hamfest in Maine this year, so plan to attend. Reservations can be made with W1BOK, Stevie, in Dexter or with W1BPI, Al, in Casco. Let's go, gang. Come meet your old friends.

MINNESOTA — The St. Cloud, Minn., Radio Club is holding its annual amateur family picnic on August 28th. It will be held at the Sauk Rapids City Park. Come and meet the gang there. It begins at 1 P.M. CST. Games for YLs and children. If further information is desired, contact Jack Maus, W0MBD, 417 — 8th Ave., South St. Cloud, Minn.

OHIO — The Buckeye Shortwave Radio Association, Akron, Ohio, will hold its annual picnic Sunday, August 28th, at Happy Days camp in Akron Metropolitan Park. Games for the children, and fun for the YL or XYL. An outstanding event in Ohio in past years, it promises to be even bigger and better this year. Registrations start at 12 noon daylight time. \$2.00 per family. Reach the park via Peninsula Road west from Ohio 8, east from U. S. 21, or via Sand Run Road north from Ohio 18, 3800 and 29,560 will be monitored to direct mobiles. Further info from W8VQI or W8WAV.

(Continued on page 136)

The
lightweight
with a
heavyweight
WALLOP!

GONSET

"Communicator"

A big 2 meter success story
in three simple words...

PERFORMANCE, PORTABILITY, PRECISION

2-METER STANDARD COMMUNICATOR
(Less squelch, etc.)
115V AC/6V DC. #3026 . . . 209.50

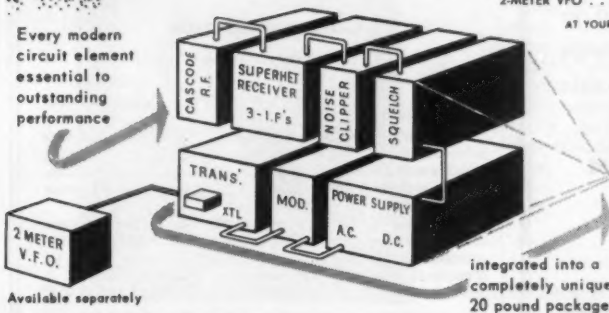
2-METER DELUXE COMMUNICATOR
115V AC/6V DC #3025 . . . 229.50
115V AC/12V DC #3037 . . . 229.50

6-METER DELUXE COMMUNICATOR
115V AC/6V DC #3049 . . . 229.50
115V AC/12V DC #3038 . . . 229.50

2-METER VFO . . . #3024 . . . 84.50

AT YOUR DISTRIBUTOR.

Every modern
circuit element
essential to
outstanding
performance



Available separately

integrated into a
completely unique
20 pound package.



OTHER
COMMUNICATORS
FOR
LOW POWER
INDUSTRIAL
AND
GROUND-TO-AIR
APPLICATIONS

GONSET CO. 801 South Main Street . Burbank, Calif.

NEED PARTS? CURL RADIO SUPPLY

439 Broad St., Chattanooga, Tennessee
406 Meridian Street, Huntsville, Alabama



CODE-SENDING-RECEIVING-SPEED

Be a Radio Ham or Commercial Operator. Pass FCC code test in few weeks. Fascinating hobby. Good pay, interesting work in Commercial field. Same system used by radiotelegraph specialists. FREE book explains how Amateurs and Operators learn code and develop amazing skill and speed. Candler System Co., Dept. 4-J, Box 928, Denver 1, Colo., U.S.A. and 52b, Abingdon Rd., Kensington High St., London W. 8, England

For "top-man-on-the-frequency" results!

BEAMED POWER—
PERFECT MATCH—
BALANCED PATTERN



YOU'RE THERE!
—with

TELREX
PRE-TUNED

**"BEAMED POWER"
ROTARIES**

End your antenna problems with the precision-built rotaries that are pre-tuned and matched for optimum performance at your site **WHEREVER YOU ARE**. No tuning or adjusting necessary. Quality constructed of finest materials throughout.

"BEAMED POWER" ROTARIES for 2, 6, 10, 15, 20 and 40 meters or combinations. Custom designs for commercial installations. Write for Bulletin H-101.

telrex INC. "CONICAL-V-BEAMS"
ASBURY PARK 2, N. J. — Tel. Prospect 5-7252

QRU? QTC

Whether you are a dyed-in-the-wool traffic man or just an occasional trafficker, your sense of good public relations tells you that ARRL Radiogram forms are a must in your station. Attractively printed on a new high grade paper, message blanks add that final touch to this important public service.

OFFICIAL RADIOGRAM FORM

Pad (70 blanks) 35¢
Message Delivery Cards
each 2¢ plain, 4¢ stamped

The American Radio Relay League

West Hartford 7, Conn.

RADIO and TELEVISION

Over 30 years N.E. Radio Training Center. Train for all types FCC operators' licenses. Also Radio and Television servicing, FM-AM broadcasting transmitters at school. Send for Catalog Q.

MASS. RADIO SCHOOL

271 Huntington Avenue Boston 15, Massachusetts
Lic. by Comm. Mass. Dept. Educ.



Ground Plane Receptacle

...for 20, 15, 10, 6, or 2 meters. Hole in bottom threaded for 1" pipe. Holes for antenna and four horizontal or drooping radials will be drilled to fit tubing sizes specified by purchaser.

Postpaid anywhere in U. S. \$6.95

LEEEO 509 Skyview Drive,
Nashville 6, Tenn.

WESTERN DISTRIBUTORS

SALINA, KANSAS

"Crossroads of the Nation"

- ★ A complete and prompt ham supply house.
- ★ Nationally accepted brands of parts, tubes and equipment.
- ★ Trade-in — liberal time and down payment plan.

HAM STAFFED:

W0MBH W0LXA W0ILB

"RED ROOM" DISPLAY COACH K0AST

PENNSYLVANIA — Pittsburgh Hamfest, Sunday, August 7th, at Totem Pole Lodge in South Park. Save 25% by registering in advance. Send check for \$1.50 to William E. Guthrie, 4949 Roberta Drive, Pittsburgh 36, Penna. Tickets are \$2.00 after July 22nd. This is the 17th annual Hamfest of the South Hills Brass Pounders and Modulators.

VIRGINIA — The Shenandoah Valley Amateur Radio Club Inc. of Winchester, Va., will hold its annual Hamfest on Sunday, August 7th, at Dickey Ridge on the Skyline Drive near Front Royal, Va. Registration fee is \$1.00 and lunch will be served for \$1.25. For information, write Richard E. Rush, WN4HXB, Secy., at P. O. Box 139, Winchester, Va.

Correspondence

(Continued from page 81)

% WFO
Farmville, Va.

Editor, QST:

For years it has been a pleasure to scan the diagrams printed in QST. That is, until recently — the hencratching which seems to be the current vogue could, in my opinion, provide satisfaction only to a power engineer or an Egyptian stone cutter.

If this is progress I, for one, would prefer to remain static in this instance and let the power people conform to the communication standard if they should so desire. If not, let them wallow in a maze of hieroglyphics and leave us be.

— C. K. Chrismon, W4GWW

73 Mather Ave.
Groton, Conn.

Editor, QST:

I cannot understand what all the fuss over the new symbols is about. It is axiomatic that we go ahead or fall behind. Any move to keep the ham informed is a good one, in my estimation. Would suggest to draftsmen that larger dots at junctions would be easier for the eye to follow a circuit. . . .

— Thomas S. Paterson, W1TVN

276 Monmouth Ave.
New Milford, N. J.

Editor, QST:

Glancing at the "Correspondence" column of the July QST, it became apparent that not too many members are in accord with my feelings on the new circuit symbols. My advice to these people is [censored]! The new symbols are certainly no violent change. Personally I like them. Keep up the good work. At least I appreciate it!

— J. Herm Rickerman II, K2HXP

QSL DOGHOUSE

76 Highland Road
Glen Cove, L.I., N. Y.

Editor, QST:

When I read of W0PDN writing to excuse some peoples' QSL peculiarities (May QST) it was with some effort I restrained my desire to take pen in hand.

Now that W3EQK (July QST) has arisen I must rush to defend VQ3CP (both his 'phone and c.w. QSLs came here air mail) and VQ2DT (his 'phone and c.w. cards for several bands arrived promptly) — we also have two cards from EA9DC — but I do share EQK's idea of a particularly appropriate doghouse for —, —, —, —, —, several "prominent" W1 and W6 "high scorers," and some

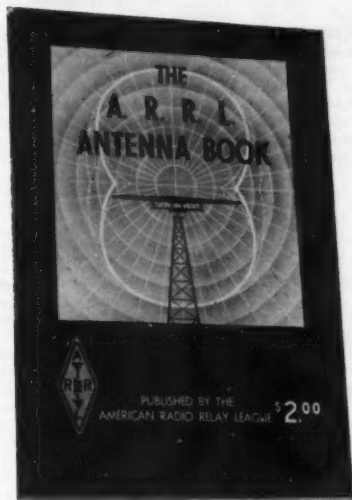
(Continued on page 138)

CANADIANS! We have large stocks of nationally advertised Ham parts. Write for Free catalog.

THE CRAWFORD RADIO

VE3YR 119-121 JOHN ST., N. VE3JU
"Goo" HAMILTON, ONT. "BIII"

Seventh Edition Available Now



7 HIS latest revision of one of the most popular publications in the Radio Amateur's Library is packed with accurate, up-to-the-minute information concerning antenna theory, design and construction.

LOOKING for information on mobile whips or planning an elaborate beam to snag those rare DX stations? From basic theory to how to build 'em, horizontals, verticals, rotaries, fixed beams, transmission lines, together with dimensions, photos, drawings, radiation patterns, you'll find the information in this new edition. Better pick up your copy now.

\$2.00

U.S.A. proper

\$2.25 Elsewhere

AMERICAN RADIO RELAY LEAGUE, INC.
West Hartford 7, Conn.

COMMUNICATIONS ENGINEERS and TECHNICIANS

- Must be willing to travel when required.
- Graduate Radio Engineers or equivalent and Electronic Technicians with extensive experience in Communications systems transmitters, receivers, terminal equipment, antennas, or a combination of these.
- For assignments on design and installation of communications facilities in U.S.A. and overseas.

Excellent salaries and fringe benefits

PAGE COMMUNICATIONS ENGINEERS, INCORPORATED

710 Fourteenth Street, N.W.

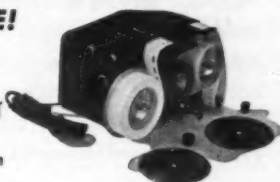
Washington 5, D. C.

LEARN CODE!

SPEED UP Your
RECEIVING
with G-C

Automatic Sender

Type S
\$28.00 Postpaid in
U. S. A.



Housed in Aluminum Case Black Instrument Finished. Small—Compact—Quiet induction type motor. 110 Volts—60 Cycle A.C.

Adjustable speed control, maintains constant speed at any setting. Complete with ten rolls of double perforated tape. A wide variety of other practice tapes available at 50c per roll.

GARDINER & COMPANY

STRATFORD

NEW JERSEY

BECOME A RADIO AMATEUR

For the **ULTIMATE** in
Amateur Equipment

WATCH ➡



INDUSTRIES

408 COMMERCIAL STREET MANITOWOC, WISCONSIN
MANUFACTURERS OF PRECISION ELECTRONIC EQUIPMENT

Is YOUR Voice Heard?



FOR more than forty years, the American Radio Relay League has been the amateur's own organization, operating under policies established by directors of his choice, serving as a clearing-house for information, representing him at international conventions, before Federal agencies and national groups, and providing other services to make his hobby enjoyable as well as useful.

MEMBERS of the League in eight ARRL Divisions will soon be nominating and voting for the directors who will represent them for the next two years. Every amateur taking part in these elections helps further the aims and protects the privileges he has as a ham. Naturally, only League members vote in ARRL elections. Let your voice be heard—sign up now.

QST and ARRL Membership
\$4 in the USA \$4.25 in Canada
\$5 elsewhere

The American Radio Relay League, Inc.
 West Hartford 7, Conn.

more (fortunately really few) outstanding exponents of the maturity theory of self election to the "untouchable non-QSL caste."

— J. Albert Stobbe, W2WZ

39 Sobro Avenue
 Valley Stream, N. Y.

Editor, QST:

Read W0PDN's letter in May QST with considerable interest. He refers to an ET2 station. . . . I don't think that W0PDN has much experience in the QSL rackets as they exist today. This station is one of a number of rare ones that periodically show up on the bands and work 5-600 stations, mostly Ws and then never QSL — except to DX editors and prominent hams, for obvious reasons. Now . . . my question is: What do they do with the International Reply Coupons?

— Theodore J. Seiter, W2FJH

P. O. Chileka
 Nyasaland

Editor, QST:

I've had more than a little correspondence with various stations, mostly Ws, who have sent me QSLs, claiming QSOs which have not taken place. I have returned the cards to the senders.

Some time ago, I informed W9BRD of the stations who qualify for my blacklist. Maybe it's a coincidence that these hopeful QSL seekers make up the greater part of this list.

One W3 gentleman waxed indignant in a letter to me, after I had returned his card. In it, he states that DX stations only reply to the "kw. and beam" fraternity and that W QRP stands no chance of working the DX. If he had the opportunity of scanning my QSL files, he would see that over half my W cards are for QSOs with stations using 150 watts and less. This self-same W3 was responsible for ruining a QSO with a much wanted EA8, by carefully zeroing the latter and calling me as I stood by to pull the EA8 through the racket. How crazy can one get?

To cap it all, this W3 fella says "why do you work a W more than once and why don't you keep the QSOs snappy when there are lots waiting?" It would be funny if it weren't tragic. As an example from my log on Nov. 16, 1954, I worked 47 W fellas in 110 minutes. If that isn't good enough, I'll apologize for being a slow operator. As for the number of times I QSO any particular W, I guess that's my business. There are some Ws, in particular, with whom a QSO is a pleasure indeed, when I feel like more than a mere exchange of RSTs and 73.

Finally, just a reminder — let's not forget that remote stations are keen on DX themselves and do not exist solely to provide fun for Ws and Gs. I've held V87, V81 and G calls since the end of '45 and therefore have been on both sides of the DX fence. It's flogging a dead horse, I know, but how fine it would be if the over-eager beavers would be a little more patient and keep their fingers off the bug until they know the DX station is ready for a call.

That's my little piece. Good huntin' to the savvy boys and may the others learn the error of their way.

— Vic Thorne, ZD6BX

TV INTEREST

1465 N. Villere St.
 New Orleans 16, La.

Editor, QST:

I read with interest the article on TV servicing in the June issue of QST. While I realize that QST is supposed to be "of, by and for the radio amateur," I think such articles are timely and of interest to a large portion of the ham fraternity. . . .

I think more such articles from time to time would improve QST.

— A. L. Maurin, W6MXP

R.F.D. No. 1
 Glastonbury, Conn.

Editor, QST:

Many thanks for the article, "Elementary TV Trouble Shooting," by W7MID in June QST. "Beat" covers a lot of territory, but this one is certainly one of the best in QST for some time, and this issue will be especially marked on the binding, as are some others, for ready reference. I think that space in QST was very well used.

— Bun Doubleday, W1UJA

HAM-ADS

(1) Advertising shall pertain to radio and shall be of nature of interest to radio amateurs or experimenters in their pursuit of the art.

(2) No display of any character will be accepted, nor can any special typographical arrangement, such as all or part capital letters be used which would tend to make one advertisement stand out from the others. No Box Reply Service can be maintained in these columns, nor may commercial type copy be signed solely with amateur call letters.

(3) The Ham-Ad rate is 30¢ per word, except as noted in paragraph (6) below.

(4) Remittance in full must accompany copy. No cash or contract discount or agency commission will be allowed.

(5) Closing date for Ham-Ads is the 20th of the second month preceding publication date.

(6) A special rate of 7¢ per word will apply to advertising which, in our judgment, is obviously non-commercial in nature, and is placed and signed by a member of the American Radio Relay League. Thus, advertising of bona fide surplus equipment owned, used and for sale by an individual or apparatus offered for exchange or advertising inquiring for special equipment, if by a member of the American Radio Relay League take the 7¢ rate. An attempt to deal in apparatus in quantity for profit, even if by an individual, is commercial and all advertising by him takes the 30¢ rate. Provisions of paragraphs (1), (2) and (5), apply to all advertising in this column regardless of which rate may apply. To expedite handling of your copy please state whether you are a member of ARRL.

(7) Because error is more easily avoided, it is requested that signature and address be printed plainly. Typewritten copy preferred, but handwritten signature must accompany all authorized insertions.

(8) No advertiser may use more than 100 words in any one issue nor more than one ad in one issue.

Having made no investigation of the advertisers in the classified columns, the publishers of OST are unable to vouch for their integrity or for the grade or character of the products or services advertised.

QUARTZ—Direct importers from Brazil of best quality pure quartz suitable for making piezo-electric crystals. Diamond Drill Carbon Co., 248 Madison Ave., New York City 16.

MOTOROLA use communication equipment bought and sold. W5BCO, Ralph Hicks, 204 E. Fairview, Tulsa, Okla.

WANTED: Cash or trade, fixed frequency receivers 28/42 Mc. W9VIV, Troy, Ill.

WANTED: Early wireless gear, books, magazines and catalogs. Send description and prices. W6GCH, 1010 Monte Drive, Santa Barbara, Calif.

CODE also? Try new method. Free particulars. Donald H. Rogers, Ivyland, Penna.

SUBSCRIPTIONS. Radio publications. Latest Call Books, \$4.00. Mrs. Earl Mead, Huntley, Montana.

URGENTLY need AN/APR-4 items particularly tuning units for important defense contracts. New high prices. Engineering Associates, 434 Patterson Rd., Dayton 9, Ohio.

OUTSTANDING ham list always. Our prices on trade-ins of all amateur brands are realistic and down to earth. We feature Johnson National, Collins, Hallicrafters, Gonset, Elmac, Harvey-Wella, Morrow, Central Electronics and other leaders. We trade easy and offer our own time-payment plan tailored to fit you. All leading brands of new equipment always in stock. Write today for latest bulletin, Stan Burghardt, W9BJV, Burghardt Radio Supply, Inc., Box 41, Watertown, S. Dak.

ANTENNA for bandswitching transmitters up to 300 watts input, approx. 120 feet long, centered with 75-ohm line, 70 feet included, low SWR, tunes 80–40–20–10 meter bands. U. S. Patent 2,535,298. Each one tested for resonance on all bands. Send stamp for details. \$18.95 each. Lattin Radio Laboratories, 1431 Sweeney St., Owensboro, Ky.

MICHIGAN HAM! Amateur supplies, standard brands. Store hours 0800 to 1800 Monday through Saturday. Roy J. Purchase, W8RP, Purchase Radio Supply, 605 Church St., Ann Arbor, Michigan. Tel. 8-8696, No. 8-8262.

2-METER aluminum Brownie beams, \$22 and up. Write to H. W. Snyder, W3LMC, 4330 Glenmore Ave., Baltimore 6, Md.

WANTED: All types aircraft & ground transmitters, receivers, AR-13, RT18/ARCI, R5/ARN7, BC610E, BC221 mounts and parts wanted. Fair prices possible paid. Dames, W2KUC, 308 Hickory St., Arlington, N. J.

ATLANTIC City vacation! Commodore Hotel, Kilowatt accommodations at low power prices. Luxury rooms with bath and radio. Budget special rooms with running water. Write for information and reservations. Ben Robin, W2BIG, Manager, Commodore Hotel, 715 Pacific Ave., Atlantic City, N. J.

WANTED: Bargains in transmitters, receivers, laboratory and test equipment, also miscellaneous and unusual gear, etc. What have you? Please state price desired. Especially interested in hunky power supplies, large filter chokes and condensers, etc. Also need plate transformers putting out about 4,000 V or more each side center. Harold Schonwald, W5ZZ, 718 North Broadway, Oklahoma City 2, Oklahoma.

LEECE-NEVILLE 6 volt system, 100 amp. alternator, regulator & rectifier, \$60.00. Also Leece-Neville 12-volt system 100 amp. alternator, regulator & rectifier, \$85.00. Good condition. H. A. Zimmermann, 570 Jamaica Ave., Brooklyn 8, N. Y. Ulster 2-3472.

NEW and used Motorola, Link, RCA, G-E, etc. FM commercial communications equipment bought & sold. Allan M. Klein, W2FOU, 95-33 225th St., Bellerose, L. I., N. Y. Phone FL 4-3394.

VAN SICKLE has the new or used gear. Taylor 866As, \$1.95. Gene, W9KJF, 1320 Calhoun, Ft. Wayne, Indiana.

OUTSTANDING QSL samples 10¢ (refunded). "Rus" Sakkers W8DED, P. O. Box 218, Holland, Mich.

QSLs! Samples, dime. Printer, Corwith, Iowa.

QSL-SWLS. Meade W9KKL, 1507 Central Avenue, Kansas City, Kans.

QSL-SWLS. Samples free. Backus, 5318 Walker Ave., Richmond, Va.

QSLs, SWLS. America's Finest!!! Samples 10¢. C. Fritz, 1213 Briar-gate, Joliet, Ill.

QSL-SWLS. 2-color: 125 for \$2.00. Samples 10¢. Bob Garra, Lehighton, Penna.

QSL-SWLS. 100, \$2.25 up. Samples 10¢. Griffith, W3FSW, 1042 Pine Heights Ave., Baltimore, Md.

QSLs. New Designs: 2-call and photo cards. Star Printing, 130 S. Glenoaks, Burbank, Calif.

QSLs. Nice designs. Samples. Besesparis, W3QCC, 207 S. Balliet St., Frackville, Pa.

QSLs—The kind you want. Graphic Cra's, Route 12, Ft. Wayne, Ind.

QSLs: Attractive. Inexpensive. Samples free. W3EHA, Cy Jones, 840 The Terrace, North, Hagerstown, Md.

QSLs! Modern designs and craftsmanship. Samples 10¢. Tooker Press, Lakehurst, New Jersey.

QSL Specialists. Distinctive. Samples free. DRJ Studios, 1811 No. Lowell Ave., Chicago 39, Ill.

DELUXE QSLs—Patty, W2HAZ, Box 27, Trenton, N. J. Samples 10¢.

100 Free QSL cards with order. Samples 10¢. World Printing, 166 Barkley, Clifton, N. J.

QSL-SWLS. Samples free. Bartoski, W1YHD, Williamstown, N. J.

QSL-SWLS. Cartoons, Rainbow, others. Reasonable. Samples 10¢ (refunded). Joe Harms, 225 Maple Ave., North Plainfield, N. J.

QSLs of distinction! Three colors and up. 10¢ brings you samples of distinction. Uncle Fred, Box 86, Lynn, Penna.

QSLs. Samples free. Alberson, W4HUD, Box 322, High Point, N. C.

QSLs! Two colors, \$2.00 hundred. Samples for stamp. Rosedale Press, Box 164, Asher Station, Little Rock, Ark.

QSLs "Brownie." W3CJI, 3110 Lehigh, Allentown, Penna. Samples 10¢; with catalogue, 25¢.

QSL-SWL cards. Sensational offer. Bristol stock 500 1 color \$3.95, 2 color \$4.95, 3 color \$5.95. Super gloss \$1.25 extra. Rainbow cards. Samples 10¢. QSL Press, Box 71, Passaic, N. J.

QSL samples. Dime, refunded. Roy Gale, W1BD, Waterford, Conn.

QSLs. Postcard brings samples. Fred Leyden, W1NZJ, 454 Proctor Ave., Reverse 31, Mass.

QSL-SWLS. Samples 10¢. Malgo Press, 1937 Glendale Ave., Toledo 14, Ohio.

QSLs. Distinctively different. Postpaid. Samples free. Dauphinee, K6JCN, Box 66009, Mar Vista 66, Calif.

QSL-SWLS. Varicolored, specialist, 10¢ samples. Snyder, W9HIU, 113 Harrison, Jeffersonville, Ind.

UNUSUAL! Vivacolor! Illustrated QSLs, typolithographed. Free samples. WAT, Box 128, Breckville, Ohio.

QSLs. Something new—Different—All printed in 3 colors or more on glossy stock, \$3.85 per 100. Preference when ordering such humorous, plain or modern. Be surprised. Satisfaction guaranteed. 2-day service. Constantine Press, Bladenburg, Md.

PITTSBURGH Hamfest: Sunday, August 7, 1955, at Totem Pole Lodge in South Park. Save 25% by registering in advance. Send check for \$1.50 to William E. Guthrie, 4949 Roberts Drive, Pittsburgh 36, Pennsylvania. Tickets are \$2.00 after July 22nd. This is the 17th annual Hamfest of the South Hills Brass Pounders and Modulators.

NATIONAL receivers SW-54, NC-88, NC-98, NC-125, NC-183, HRO-60 in stock. Attractive swaps or trades for used ham receivers and surplus equipment. Dynamotors—6 VDC/420 VDC 280 Ma., good used, \$12.95; 12 VDC/400 VDC 500 Ma. including filter base, starting contactor, excellent, \$16.95; surplus RG-8/U cable, 100 ft., \$5.95; 250 ft., \$13.25, 500 ft., \$25.00. Free Bargain Bulletin. Visit store for our unadvertised bargains. Lectronic Research, 719 Arch St., Philadelphia 6, Penna.

PRINTED circuits made from your drawings. Etched circuit supplies. Rowe Engravers, 492 East 39th St., Paterson, N. J.

WE will be looking for you at the ARRL Central Division Convention at South Bend, Indiana, October 15–16 are the dates. This will be the Big One for 1955! Advance registration \$3.50. Write to Box 551. Make checks payable to Central Division Convention. Do it now!

UFO data compiled. W5CA.

SELL: Model 12 teletype with cover, table, keyboard and AC motors. Also W2BFD converter. All in excellent cond. W3MKZ, 87 College Ave., Annapolis, Md.

SELL: Receiver, NC-128X, in gud cond., just aligned; \$65; xmitter Parallel 807s, 80–40–20 meter coils, relays, xtal, TVI-suppressed. 100 watts, \$125. K2EUV, 307 No. Thurlow, Margate, N. J.

SEE you at Hamfests! Radio Club 21st. Annual Picnic and Air-mobility Meet at Mance Park near Chicago on Sunday, August 14th. Donations \$1.00 in advance, \$1.25 at the gate. W9ECV, Sec'y., 8908 So. Constance, Chicago 17, Ill.

WSAXI/MM correct mailing QTH Arthur E. Hutchins, R/OSS Fullerton Hills, Bernuth Lembcke Co., 420 Lexington Ave., New York 17, N. Y.

PANORAMIC Adapter, AN/APA-10 tech. manuals: \$2.75 postpaid in U. S. A. Electronicraft, Bronxville, N. Y.

WANT: NARCO Aircraft Omnirange, etc.; have Hallicrafters S-39, S-36, BC-611C Handi-Talkies. W1QHC, Barfield, 4 Brinsley St., Dorchester 21, Mass.

HAMMARLUND HQ-129X for sale. In perfect electrical, physical and mechanical cond. Late model. Has HQ-140X bandspread dial (covers 15 meters), \$165 or best offer. Dave Smith, K2CHS, 54 Butler Road, Scarsdale, N. Y.

HRO Crystal calibrator, as new, \$15. W3BFF.

MIAMI or vicinity, for sale or trade, complete xmitter, 600 watts, bandswitching, parallel 813s, pi-net final, pi-net antenna tuning after lowpass filter, complete break-in with duplex keying, AM phone (screen), fully metered, enclosed metal cabinet, VFO, 807, 807, 813s for \$225, or trade for 4 x 5 camera and equip. Pick up any QTH. W4EN, 433 DeSoto Dr., Miami Springs, Phone 88-8117.

HOME study course commercial first class ticket, half price. Bill Norman, Box 868, Raton, N. M.

COMPLETE STATION, \$150. F.o.b. Ventura, Calif. Hallicrafters SX25 recvt, matching spkr, AFI xmitter, AC1 antenna coupler, VFI, VFO, all Heathkit. Assembled and work perfectly. Will substitute Super Pro Sp210 receiver (BC779) for \$25 more. K6GGM, Rube Kaplan, 3150 Armada, Ventura, Calif.

RESISTORS 2 each all RETMA 10% values 1/4 watt RC21 total 154 new. No surplus, \$6.50 postpaid, U. S. A. Aymond, W5UHV, 7125 Meadow Lake, Dallas, Texas.

SELL: SWR indicator. Leave in transmission line, negligible insertion loss. Handles 2 to 500 watts. Requires 0-1 Ma. meter. For 52 ohm coax, 160 to 10 meters: \$15.00, Bill Morgan, W4HGE, 3870 N.W., 64th Ave., Miami Springs, Fla.

SELL: Most all issues of QST from 1939 in original condx; IRE Proceedings from 1948, Make offer. C. H. Willard, W2EZB, 2023 Baker Ave., Utica, N. Y.

WANTED: Pierson-DeLane PR-15 receiver. "Griff", Box 4522, University Station, Tucson, Ariz.

ALASKA Bound: SCR-522 with tubes and dynamotor, few crystals. MK II transceiver, 2-8 and 229-241 Mc/s (convert to 2) SCR-583 (needs repair) with book and PE-152. First reasonable offer accepted. Tilleman, 8409 Tibet, El Paso, Texas.

FOR Sale: Collins 32V3 transmitter, excellent condx, \$475., with 35C2 low pass filter, \$20. Tecraft 2-meter converter, 26 Mc to 30 Mc. I.F., never used, \$25; 3-1/2, 20-meter shortbeam, nearly new, \$35; 32-4d, U.H.F. Resonator coilinear, 2-meter beam completely chrome-plated \$38. New, never used. You pay shipping charges. K. W. Ring, 239 E. Main Rd., Conneaut, Ohio.

URGENTLY need coil sets "C" and "D" for HRO-5. These will then complete emergency equipment here. Must be in tip-top shape. All offers prompt QSL. WPMCL/1, Box 95, Waquoit, Mass.

FOR Sale: Like new 32V2 with spare 4D32 tube, \$425.00; Wilcox CW3 receiver xtal controlled on WVV 10 Mc, \$35; James Knights 1000 kc-100 Kc-10 Mc frequency standard, \$35; DB20, \$15. All prices are F.o.b. Peoria, Ill. Claude Moore, W9HLF, 1201 Lehmann Bldg., Peoria, Ill.

RECEIVERS-Transmitters, repaired and aligned by competent engineers, using factory standard instruments. Collins, Hallicrafters, Hammarlund, National. Our nineteenth year. Douglas Instrument Laboratory, 176 Norfolk Avenue, Boston 19, Mass.

FOR Sale: Collins 75A-3, all modifications, equal new condx, \$399. Will ship; Millen R-9er with 20 and 10 coils, new condition, \$12.75; Telrex 3-clement 10, new, \$57.50; 3 c. 15, used only 3 months, \$85. Will ship. W4FPS, Leonard, Box 2366, Roanoke, Va.

WANT: 32V2 or 32V3 xmitter. Cash for the best deal. Write to Box 516, Stryker, Ohio.

FOR Sale: Complete station: RME84 receiver plus Q5'er and Eldico TR75TV transmitter including one xtal, now in operation and in gud condx: \$100. Complete, prefer local sale. Vince Fitzgerald, W21BQ, 317 Pittsburg Ave., Massapequa Park, L. I., N. Y.

WANTED: NC-101X in gud condx; will pay \$65 cash. K2KLL, 1514 E 10th St., Brooklyn, N. Y.

1200 mile move in August says "sell": KW phone/c.w. 160 thru 10; NC183D; 2.5 Kw power supply; xformers. Prefer local area sale. W9OFU, 138 Chandler Blvd., Macomb, Ill.

FOR Sale: Supreme AF100 with 4-65A final, \$225; SX42 with R-42 speaker, \$185; BC342 with spkr and AC power, \$65; BC221 with audio and AC supply, \$75; Astatic T-3 mike with push-to-talk stand, \$15; Gonset 10 meter converter, \$10; Telrad frequency standard, \$20; Erec beam rotator, \$30; Webster Electric PA System 50 watt, \$25. Chaffield, W4BXE, Redstone Arsenal, Huntsville, Ala.

FOR Sale: Meissner Traffic-master receiver. K2GQS.

WHY buy substitutes when almost brand-new equipment is available below dealer's cost? Collins 32V-3 and 75A-2A with factory installed mechanical filter, FM adapter and xtal calibrator, including 800 cycle and 3 Kc filters. Matching speaker in original factory carton. Guaranteed factory tested and hardly used. Brand new extra 4D32 tube included. Price: \$895.00 complete F.o.b. Cedar Rapids, Iowa. Write or wire Charles W. Boegel, Jr., W9CVP, 1500 Cent Point Road, NE.

SALE: Lyco 600, also AM modulator. Roger Simmons, Ashland, Ohio.

MOVED: Chassis, good, new and used ham parts: \$1.50 grab-bag postpaid. Mel Stricker, 233 Kelton St., Allston, Mass. Photos of extra gear.

TELEVISION Ham's TV exciters, Link type, 2056; R.F. waveform monitor type 287; Monoscope 2506, complete. Link 12 volt power supplies, \$18; Mobile receivers 2/4 Mcs. and 30/40 Mcs. \$30. Looking for Gonset Communicator or other ham gear. W2OEA, Higley, 736 Sheridan Ave., Roselle, N. J.

FOR Sale: Back issues of QST, 1924 thru 1932 in yearly binders; 1933 thru 1953 without binders. Sell by year only. What do you bid? R. F. Steintner, W8NY, 16507 Lilac, Detroit 21, Mich.

YLR Directory for 1955 now available. Useful to seekers of VLCC and WAS/YL certificates. Send \$1.00 to G. Eastman, W6DXI, 735 Glen Ave., Glendale 6, Calif.

SELL: HQ-129X, speaker, original cartons: \$122. Globe Scout transmitter, like new, with BC459A VFO, \$65.00. F.o.b. New York. Irwin Hyman, 12 West 87th St., New York City.

SELL: 32V1 and 75A1, in excellent condx, \$600. F.o.b. Royal Oak, Mich. L. Opalka, W8WBG, 721 N. Main.

SELL: Complete 125 watt modulator; \$55; modulation monitor \$15; S76 Hallicrafters, \$115; 250-watt 813 rig, fone/c.w., bandswitching 160-10, push to talk, step to send, many other conveniences. Attractive unit complete with Heathkit VFO and extras. Sacrifice at \$200. Need money for college. Belin, W6GXI, 3441 Douglas St., Sioux City, Iowa.

1 KW xmitter, two 250TH r.f. final; 210 watt driver; Welco oscillator, Meissner signal shifter, 500-900 watt modulator; four 203Z or TZ40 to 1500 watt modulation transformer; two 807 drivers, Masco speech ampl. driver; 100TH instead of 250TH may be used without changing anything. 2800 VDC 500 Ma. filtered (r.f.) 1300 1850 VDC 500 Ma. filtered (speech) plus all power supplies for drivers; all R.F. stages metered; 80-10 meters with all coils; 1 Kw antenna coupler. TVI-suppressed. In excellent condx. Write W9QIY, 3601 Osceola St., Denver, Colorado.

COMPLETE 12-volt mobile system; all equipment in excell. condx and only 7 months old. Includes Elmac AF-67, Gonset Super-Six and noise-clipper; Shure 102C mike, coax relay, Master Mobile Mount antenna and spring mount, Model 666 allbinder coil; PE-101C dynamotor with filters and relays mounted in base, and Morrow generator noise filter. Complete: \$180. Separately, a little more. K2JZT, Adolph, 8 Bridge St., Sidney, N. Y.

FOR Sale: Meissner 150-B transmitter, 250 w. 813 final; 1.5 to 12.5 Mc. converted to cover 10 m. and 20 m. bands; TVI suppressed. Single switch on front panel changes to 250 w. SSB final. Hear it on 75 mornings or week-ends. Price: \$250 with mike, key and spare parts. J. Taylor, W2OZH, Stanwood Rd., Mt. Kisco, N. Y.

WANTED: BC-348 or comparable receiver located in or near New York State or Ontario. VE3DTN, Stock, Collins Bay, Ont., Can.

TRADE: Bolex H-8 movie camera, 3 lenses in turret case, extra spools, instruction book (cost over \$400 new) for all hand xmitter and recvr. W9BUB, 713 3rd St. N.E., Cedar Rapids, Iowa.

FREE list: parts, gadgetry, meters, oddities. Art Sorrell, W3AXG 6310 63rd Pl., Riverdale, Md.

CLEANING House! Collins 75A2, \$325; factory-built sideband alizer with AP-1, \$65.00; Stancor 500 watt modulation transformer 1:1, \$30.00; new Triplett 650 VTM, \$35; like-new factory-built Viking Ranger with tubes, \$220. List on request. W9WQE, 5236 Ames, Omaha, Nebr.

GOLD Lettering, black buckram binding, special low prices. QSTs, seven volumes: 1934, 1935, 1936, 1937, 1940, 1944. L. A. Morrow, W1VVG, 99 Bentwood Road, West Hartford 7, Conn.

BARGAINS: With new guarantee: R-9er, \$12.50; SW-54, \$29.95; S-38C \$35.00; S-40B, \$79.00; Lyco 600, \$99.00; S-27, \$99.00; SX-43, \$129.00; S-76, \$149.00; SX-71, \$169.00; SX-42, \$169.00; HRO-50, \$275.00; Eldico TR75TV, \$39.50; Heath AT-1, \$22.50; Meck T60, \$49.50; HT-17, \$25.00; Viking II, \$39.50; Globe Trotter, \$49.50; Globe Champ, \$69.00; Harvey-Wella Deluxe \$69.00; Elmac A-54, \$99.00; Viking I, \$179.00; Viking II, \$229.00; SS-75, \$169.00; HT-9, \$139.00; Globe King 400B, \$325.00; 32V1, \$375.00; 32V2, \$425.00; 32V3, \$525.00. Free trial: Terms financed by Leo, W9GFO. Write for catalog and best deals to World Radio Laboratories, 3415 West B'way, Council Bluffs, Iowa.

HI Voltage components, parts for complete \$13 rig. B&W low pass filter, etc. Special. Send for list. W3FYW.

FOR Sale: 75A2 with 3 Kc. mechanical filter, 32V2, Gonset 110 V. A.C. converter (rare), 6-10-15, Baymobile (75 meter) antenna, model 15 teletype, keyboard perforator; magazines: Electronics, CQ complete; IRE Proceedings since 1926, less 2 issues; QST, less 11 issues; RCA Review, less 1 issue. Write Fred G. Schmidt, W4NYF, Box 4946, Ft. Lauderdale, Fla.

TRADE: 222 Remington Rifle with 2" Unertle ultra Varmint scope for band-switching transmitter. Ed Muller, 1436 East 28th St., Brooklyn 10, N. Y.

FOR Sale: Immaculate ham station: equipment cannot be told from new. Original boxes and instructions with most pieces. Cleanest Viking II in country, professionally wired. Used about 20 hours: \$225.00; HQ140X in same condx with matching spkr, original box, instructions, used 20 hours: \$225.00. Two excellent Johnson Match Boxes, \$39.00 each; Globe Scout 65, perfect, only about 10 hours operating time: \$79.00; B&W grid dip meter, new, \$29.50; NC57, new tubes throughout, very nice: \$49.00; Philco pocket scope, \$15.00; new Johnson low pass filter \$11.00. Bruce Vaughan, W5HTX, Springfield, Ark.

K8AXM will trade Savage 22 Hornet 6-shot rifle with scope in A-1 condx for a good mobile transmitter and receiver or converter. Jim Pixler, K8AXM, Zimmerman, Minn.

LEECE-Neville 100 amp alternator with ammeter. Ford mount. \$85.00 or trade for G-E, Motorola 2-way radio equipment capable modification to 6 meters. W7KKN, 10715 Villa Lane, Tacoma, Washington.

2 Meter beams: 6 element, horizontal or vertical, all seamless aluminum. \$6.95 prepaid. Wholesale Supply Co., Lunenburg, Mass.

COLLINS 75A2 with speaker and 100 Kc xtal, \$350; Viking II with VFO, L.P., filter, coax relay and mike, \$300.00. W3FVD, Mason, 1410 Holly St., N.W., Washington 12, D. C.

MEISSNER 150B, \$225.00, in excellent condx, 160 thru 20 meters, phone or c.w., TVI-suppressed. Will deliver anywhere in New England. E. Bossmann, W1OUZ, 79 Sanderson Ave., Dedham, Mass. Tel. Dedham 3-148R.

WANTED: ART-13 transmitters. Write B. Spivey, 3117 Rolling Road, Chevy Chase, Md.

BARGAINS with new guarantee and completely reconditioned: S38, \$29.00; S40A, \$69.00; S40B, \$79.00; S76, \$129.00; SX71, \$159.00; NC98, \$119.00; HQ140X, \$219.00; TBSSD, \$79.00; Meissner EX, \$39.00; Viking II, \$239.00; Viking VFO, \$39.00; HQ-129X, \$P400X, NC125, NC183D, NC240D; HRO60, AR88, 75A1, 75A2, 75A3, 32V1, 32V2, 32V3, PMR80X, AF67, Super 6, Commander, B&W 5100, many other things. Shipped on approval. Easy terms. Satisfaction guaranteed. List free. Henry Radia, Butler, Mo.

FOR Sale: 6-volt power pack (Palco) 500 volts, 225 Ma., second Hi voltage 200 to 300 built-in relay, etc. Almost new. Reason for selling: now using 12 volt, same type, 10 meter close spaced. Hy-Lite beam in gud condx: \$15.00. W9LQI, Ashton, Illinois.

CASH for AN/ARC-1, BC-610E, BC-614E, BC-939, BC-729, BC-221, TCS and others. Also Sig. Corps, Navy, Air Force stock catalogs, maint. and insur. TM's for war surplus equipment. Amber Co., 393 Greenwich St., New York 13, N. Y.

SUPER DX Transmitter, estate of W2CZV; 8005s driving 450THs. Power supplies, etc., in 6 foot rack; Collins 75A2 receiver; Sonar FM exciter, etc. Stamp for list. Mrs. Braman, 54-17 Jamaica Ave., Woodhaven, L. I., N. Y.

WANTED: Waters Conley BC1016 inked tape recorder in 1st class working condition. Please send details and price in first letter. R. J. Strohecker, W7NNR, 2959 S. W. Montgomery Dr., Portland 1, Oregon.

WANTED: Gonset 2-meter converter. WIWRJ, c/o ARRL, 38 LaSalle Rd., West Hartford 7, Conn.

NEED ARC-1a, Lou Athanas, P. O. Box 5878, Bethesda, Md.

SELL: Hallicrafters late model HT-9 transmitter, coils 10-20-80-160; \$125.00; Meissner EX signal shifter, turret strips 6 to 160 mtrs. \$45.00; Elmac A-54-H transmitter, 6 volt 200 mill 450 volt vibrator supply; Shure 510-C mike, ant. relay, base spring mount, whip, cable, etc. \$120.00; Morrow 3-BB converter with built-in noise limiter, \$18.00. All gear in clean and in A-1 condx. F. N. Lambour, WJDCV, Nicktown, Penna. Tel: 14-N.

SELLING: Out: HQ-129X recvr with matching speaker, excellent, \$140.00; factory-wired C E Model A slicer, \$45.00; factory-wired C E 458 VFO, never used, \$40.00; Single 813 AM xmitter, TVI suppressed, 300 watts, 811 Class B modulators, all power supplied; VFO, gray rack mounting, professional. Make offer. W9YDO, Williams, 4847 No. 41st, Milwaukee 9, Wis.

WANTED: Multi-Match modulation transformer capable of 600 watts audio, also Amertran 6200 volt, 2 KVA plate xformr. Vic Crawford, WITYQ, RFD 5, Danbury, Conn.

SELL: HRO-MX with power supply, speaker, regular bandspread coils plus 3 low frequency coils including broadcast, \$125.00 or HQ-129X with speaker, \$145. Both recently realigned and in gud condx. BC453B Qser less pwr supply, \$12; Vibroplex bug, original type, \$7.00. Robert Arntz, WVPT, Millersville, Penna.

CENTRAL Electronics: A slicer, \$59.95; 10A, \$59.95; Collins 32V1 \$385.00; 32V2, \$450.00; 32V3, \$530.00; Deltronics CD-144, \$99.95; Hallicrafters SX-18, \$69.95; S-20R, \$44.95; SX-24, \$74.95; S-29, \$44.95; S-38, \$29.95; S-40, \$59.95; S-41G, \$24.95; SX-42, \$179.95; S-53A, \$39.95; S-72, \$49.95; S-81, \$34.95; HT-17, \$39.95; HT-18, \$59.95; Hammarlund 4-11, \$34.95; 4-20, \$44.95; Harvey-Wells TBS-50C, \$69.95; SPS-50, \$79.95; SPS-50, \$29.95; VFO, \$37.50; Meissner EX, \$44.95; FMX, \$4.95; Millen 90281, \$49.95; 90700, \$19.95; 90800, \$19.95; 90881, \$69.00; National HFS, \$99.95; HRO-5TA1, \$175.00; NC-46, \$59.95; NC-57, \$69.95; NC-88, \$89.95; SW-54, \$34.95. Complete list of largest inventory used equipment in the East; write to Carl W1BFT, Evans Radio, Concord, N. H.

32V3 Collins 75A3, like new, with best B&W low-pass, xtal-cal., 1 Kc. and 1 Kc. filter, SP-44 Hallicrafters Panadaptor, 10-A multi-phase exciter, sideband-slicer; sell all or part. W8HYM, 25621 Lois Lane, Detroit 19, Mich. Phone ELgin 6-2900.

FOR Sale: Viking II and VFO; \$250.00. Less than year old. W8FIZ, Hollis Roels, 584 Wash. Ave., Holland, Mich.

KILOWATT-PLUS plate transformer: \$10.50 and up. Write for list. Fenwick, W7VMP, 3127 No. 17th Drive, Phoenix, Ariz.

HALLICRAFTERS 35C Receiver \$100.00; Collins 32V2 with FM adapter, \$510.00; changeable letter neon sign, wonderful for shop window; very rare, \$100; Millen Exciter, \$20.00; low power Lyco 75-meter mobile xmitter, \$15.00; mill, all capitals, \$45.00; several items left from my July Ham-Ad. W2ADD, 129 Midland Ave., Glen Ridge, N. J.

TRADE: complete lapidary outfit with all accessories, for xmitter, recvr, or other ham equipment. W9SCN.

.051 PERFORATED Aluminum sheet, 5/64" OD holes, 1/4" centers, \$1.20 sq. ft., cut to size. Send for listing on Beams, Aluminum tubing, etc. Radcliff's, Fostoria, Ohio.

SELL or trade: BC-610, like new, with completely TVI-suppressed, bandswitching, pi-section, 4-250-A final; BC-614-E speech amplifier with built-in clipper-filter; also Collins 310-B exciter; pick-up deal only. Glen Richie, W4JGO, P. O. Box 26, Salem, Va.

WANTED: SX62A, 5BR1, NC183D, SX-71, reasonable, cash. Adriance, Navy 115, Box 23, Fleet P. O., New York.

VIKING II, \$200.00; Heath OL-1 'scope, \$20.00; Eico 360 sweep generator, \$25.00; Heath SG-8 signal generator, \$10.00; Revere T-900 tape recorder, \$125.00; Johnson Match-Box, \$35.00; SWR Bridge, \$7.50. Fred S. Eggett, W8FIL, 11833 Wisconsin, Detroit 4, Mich.

SELL: New and used Gonset mobile equipment; two and six meter Communicators, etc. I buy, sell and trade mobile gear. Will take gear in trade for new and used Polaroid Cameras and accessories. R. T. Graham, W1KJT, Box 23, Stoneham, Mass. Tel. ST 6-1966.

SELL: Globe-King 400-A, TVI-suppressed; cabinet shielded, all leads filtered; Drake lo-pass filter on output; coils for 10, 20, 40, 80 mtrs. In excellent condx, with instructions manual: \$325.00. F.o.b. Shreveport, La. No trades. Going to medical school. Larry McCollum, W5PTJ, 150 Carrollton Ave., Shreveport, La.

RECEIVER: Basically BC-348S, mounted in rack cabinet, includes power supply, speaker, clipper-filter, S-meter, Universal output transformer; \$85.00. Will ship. Gary B. Jordan, W8LWL, 621 West Schantz, Dayton 9, Ohio.

SALE or trade: 260 Sam's Photofacs with 20 binders, \$285.00; 2KW plate transformer, 110V-60 cy. pri. 6200V, et. \$45.00; 2 chokes 24.5 hys. 300 Ma., 5KV insulation, \$15.00 ea; RCA Kw modulation transformer with screen winding, \$35.00; T-50/ART2 Pr. 81a final, with tubes and dynamotor, \$65.00; T-23/ARC5 with tubes, \$22.00; HT-18 transmitter, \$65.00; 6 - 829B tubes, \$6.50 ea.; 20 - 5763 tubes, \$1.25 ea.; 6 - 304TL tubes \$3.25; Jackson Tube Tester, Mod. 648, \$69.00; Hickok sweep generator Mod. 610A, \$150.00. Interested in Viking, W5100, DX100 or what have you to trade. All letters answered. W8LAH, Box 547, Fostoria, Ohio.

SELLING: Collins 310C2, perfect, \$95.00; Millen 90801 band-switching exciter with tubes, looks good, electrically fair, \$50.00; Want: Communicator, Viking Ranger, W7VMP, 3127 No. 17th Dr., Phoenix, Ariz.

SELL teletype perforator, reperforator, 7" TV recvr, \$30; new TG-10-F keyer, \$12.95; pair ARC-5 receivers with power supply, excellent, \$22.50. Send stamp for list. W9ERU, 2511 Burmount Rd., Rockford, Ill.

HEATH AR2, AT1 plus 2 crystals and antenna coupler carefully assembled. No time for using, \$55.00. Johnson Match-Box, never used: \$45.00. Both delivered Mississippi East. T. Willis, Bettiswood Rd., Norwalk, Conn.

PASS Amateur Theory Exams. Check yourself with sample FCC-type questions & Novice and General Class examinations. All for only 50¢. Ameco Electronics, 1203 Bryant Ave., New York 59, N. Y.

DELUXE Vibroplex, jeweled movement, carrying case; used very little. Best offer takes it. W0DFA, M. H. Gordon, Storm Lake, Iowa.

FOR Sale: Globe King "500"; original crate, unused: \$625.00. W5VRO, Hemlock 6-0025. James W. Craig, Jr., 3413 West Roosevelt Dr., Lake Charles, La.

FOR Sale: Old HRO, in gud condx, \$50; Miscellaneous collection of radio gear vintage 1940 and older; some antique. Two racks, RF and audio, with power supplies. Miscellaneous tubes, 810s, 830s, 852, 204, relays, condensers, hundreds of parts. Cannot ship. Come see it. Make offer and take it away. Mrs. Esther Higson, P. O. Box 136, Clinton, Conn.

HAMS! Hook-up wire below wholesale 18-20 ga. Sample, Gay, Box 8024, Long Beach, Calif.

MODERNIZE Now! Highest trade-in allowance ever offered! Top notch used equipment. Lowest wholesale prices anywhere. Write right now about any gear you want, new or used. Marshall Electronics, 855 Burlington, Frankfort, Ind.

MUST Sell HT-20, in new condx; save \$125.00; beautiful band-switching rig; heavy duty components, double shielding, blower, TVI-suppressed; continuous coverage 160 through 10, harmonics 90 db. dov n; cw. input 175 watts, phone 150, built-in low-pass; \$325. Walter Keith, 601 East Fourth St. South, Newton, Iowa.

SELL: 2 Kw Superior powerstat; variable 0-135 VAC, 15 amps; Triplet 0-150 VAC meter \$37 included; \$39.00. Want to buy reasonably priced SX-16 or 17, RME-69 or 70, HQ120X, Kirkman, W0ZHU, 2444 Dec, Lincoln, Neb.

FOR Sale: Elmac A54 transmitter, \$75; PMR6A receiver, \$90; PSR-6V power supply, \$15; 425 V 3/32 Ma. tube, \$10; W. imp. \$9.00. F.o.b. Chicago. W0BYX, 205 Evergreen, Elmhurst, Ill.

SELL: Trio TV rotator with indicator and 20 ft. of control cable, \$15.00. Wagoner, K2CZY, 1105 Emerson Ave., West Englewood, N. J.

FOR Sale: BC610E, BC614E, 2 J870 control units, complete with tubes, cables, tuning units, coils, and manual. All transformers hermetically sealed except modulation. Excellent: \$475.00; RME HF 10-20, new, \$60.00; Super Pro BC794B A-1, \$150.00. W4CDM, 634 29th St., So. Arlington, Va.

MARINE Crystals, new, guaranteed, heavy-duty types. Fast service, all frequencies. Specify frequency and socket pin dimensions. Transmitting, \$2.95; receiving, \$2.50. C-W Crystals, Box 2065, El Monte, Calif.

WANTED: BC-610, BC-614, BC-939, ART-13, DV-12, ARC-1, ARC-3, APR-4, ARN-7, TN-19, TN-54, BC-348, BC-342, TDO, BC-221, LM, APN-9, Teletype, keyers, 32V, 75A, test equipment, parts, tech manuals. Cash or trade New Johnson Viking, Ranger, B&W, Hallicrafters, Hammarlund, National, Central, Gonset, Elmac, Morrow, RME, Telrex, Fisher Hi-Fi, Pentron, Bell, etc. Write: Alltronics, Tom, WIAFN, 46 Mt. Vernon St., Boston 1, Mass. Boston Tel. Richmond 2-0048. (Stores: 44 Canal, Boston; 60 Spring, Newport, R. I.).

SELL: NC-183D, with spkr, in new condx: \$250 or better. Cash. Box 96, R.F.D. #3, Freehold, N. J.

WANTED: Communication receiver in gud or repairable condx. State lowest price and condx. M. J. Marshall, 455 Washington Ave., Dumont, N. J.

SORRY fellas, my ad ran a month ahead of time, in July QST, due to misunderstanding. QTH uncertain at that time. Apologize for any inconvenience. Am now repeating it, ready for queries: Trade: Argus V-4, 35 mm camera, 2.8 lens, flash gun, leather carrying case, all new, in original carton and Hallicrafters \$20R recvr in gud condx for Hammarlund HQ-129X, in A-1 condx. K4BGG, Joe S. White, 5892 Lemon Ave., Long Beach, Calif.

WANTED: Complete used mobile rig in gud condx, or used Gonset Communicator. Contact Ronnie Gann, c/o ARRL, 38 LaSalle Rd., West Hartford 7, Conn.

GLOBE Scout in excellent condx, \$70.00; VFO, all bands, with power supply, \$18.00. William Waters, W8KWG, 539 Henley, Birmingham, Mich.

NEED ARC/3s. S. Gabriel, 4908 Hampden Lane, Washington 14, D. C.

1 Lyco 600 transmitter with separate modulator, complete 35 watt all band phone, cw xmitter, ready to go, 1 year old, \$125.00. Single side band BC 45 converted, ready to go, just plug in to a 20A or 10A, \$20.00; 455 new condition, not converted, \$15.00. W8THJ, Ken Dela, 104 E. Greene St., Piqua, Ohio.

WILL trade toward Collins 32V3 or other good xmitter, new 1/4 tone air conditioner with thermostat and assembled new Heath VTVM-V7 with probes 336-309C, oscilloscope OL-1 with probes 342-337C; signal generator SG-8, Electronic switch S-2, bar generator BG-1; also McMurdo Silver res. cap. bridge, model 904 and gud psychometer. Want Elmac all band mobile receiver 6 volt, Trade Meissner signal shifter plus cash. Peck, W2OIF, 143 State, Auburn, N. Y. Tel. 3-3531.

FOR Sale: 32V2 transmitter and SP-400X recvr. Both sets in "like new" condx. \$425 for Tx and \$200 for Rx separately or will take \$600 for both. W5RIK, 5545 Preston Haven Dr., Dallas 30, Texas.

FOR Sale: Collins 32V2, perfect condition. First \$425 takes it. W4FLS, 220 No. Howell, Chattanooga, Tenn.

WANTED: Hallicrafters SR-75 transceiver in gud condx. E. Harvey Cunningham, W5CU, P. O. Drawer H, Rio Grande City, Texas.

HAMMARLUND HQ129X in perfect shape, very clean: \$140.00; Hallicrafters Skyriter 23, works fine, \$20.00. Will ship anywhere collect. W. Wehe, W6VZB, 16080 Cambrian Dr., San Leandro, Calif.

SELL: Dumont 241 'scope, \$175.00; Teletype equipment, Klein-schmidt full keyboard perforator for Morse code, Collins 32V2. Want: BC-610, BC-614, BC-939, ARN-7, ART-13, Tom Howard, WIAFN, 46 Mt. Vernon St., Boston 8, Mass. Richmond 2-0916.

PORTABLE power supply packs, perfect for field operation, 200 V @ 100 Ma. output including 6 V storage battery, Vibrapack, recharger in portable case: \$30.00. Literature available. Industrial Television, Inc., 359 Lexington Ave., Clifton, N. J.

SELL: 250 W. 811 bandswitching phone xmitter with pwr supplies and VFO: \$175.00. WIPCO, Andrews, 208 Valley Rd., Needham, Mass.

FOR Sale: Heathkit AT-1 xmitter, VF-1 VFO, AC-1 antenna coupler, on air one 3 hours: \$50.00 takes all. W2FNL, 56 Grand St., Garfield, N. J.

Designed for



Application



90651

The No. 90651 GRID DIP METER

The No. 90651 MILLEN GRID DIP METER is compact and completely self contained. The AC power supply is of the "transformer" type. The drum dial has seven calibrated uniform length scales from 1.5 MC to 300 MC plus an arbitrary scale for use with the 4 additional inductors available to extend the range to 220 kc. Internal terminal strip permits battery operation for antenna measurement.

**JAMES MILLEN
MFG. CO., INC.**

MAIN OFFICE AND FACTORY
**MALDEN
MASSACHUSETTS**



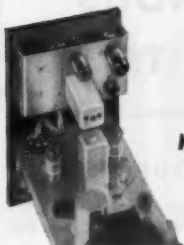
Index of Advertisers

Adirondack Radio Supply	116
Aermotor Co.	110
Allied Radio Corp.	144
Alltronics	128
American Radio Relay League, Inc.	138
QST	137
Single Sideband	106
Antenna Book	137
Mobile Manual for Radio Amateurs	2
License Manual	128
Radiograms	136
Arrow Electronics, Inc.	126
Ashe Radio Co., Walter	115
Barker & Williamson, Inc.	81, 129
Belden Mfg. Co.	99
Blackstone Electric Co., Inc.	132
Bud Radio, Inc.	104
Burghardt Radio Supply, Inc.	121
Candler System Co.	135
Centralab	94
Central Electronics, Inc.	143
C & G Radio Supply Co.	131, 134
Cleveland Inst. of Radio Elec.	100
Collins Radio Co.	74, 75
Control Circuits	134
Crawford Radio	136
Curle Radio Supply	135
Dow-Key Co., Inc., The	118
Dzerama	116
Eitel-McCullough, Inc.	85
Elidco of New York, Inc.	96
Electronic Supply, Inc.	96
Electro-Voice, Inc.	Cov. 11
Engineering Associates	130
Equipment Crafters, Inc.	122
Evans Radio	132
E-Z Way Towers, Inc.	93
Ft. Orange Radio Distributing Co.	119
Gardiner & Co.	137
General Electric Co.	1
Gonset Co., The	133, 135
Gotham Hobby Corp.	117
Greenlee Tool Co.	120
Groth Mfg. Co., R. W.	132
Hallcrafters Co.	7, 73
Hammarlund Mfg. Co., Inc.	78, 79
Harrison Radio Corp.	113
Harvey Radio Co.	105
Harvey-Wells Electronics, Inc.	87
Heath Co., The	76, 77
Henry Radio Stores	109
Hughes Res. & Dev. Labs.	125
Instructograph Co.	110
International Crystal Mfg. Co., Inc.	101
Johnson Co., E. F.	92, 112, 131
Knights Co., The James	90
K-W Engineering Co.	124
Lafayette Radio	123
Lakeshore Industries	123
Lampkin Laboratories, Inc.	108
Leeco	136
Lettine Radio Mfg. Co.	114
Lewis Co., E. B.	129
L W Electronic Lab.	124
Mallory & Co., P. R.	89
Mass. Radio & Teleg. School	36
Millen Mfg. Co., Inc., The Jas.	142
Morrow Radio Mfg. Co.	103
Mosley Electronics, Inc.	91
National Co., Inc.	Cov. III
Page Communications Engineers, Inc.	137
Petersen Radio Co., Inc.	5
Philco Corp. (TechRep Div.)	97
Polytech Devices, Inc.	134
Port Arthur College	130
Radio Corp. of America	Cov. IV
Radio Shack Corp., The	111
Radio Specialties, Inc.	95
Raytheon Mfg. Co.	130
RCA Institutes, Inc.	134
Rider Publisher, John F.	112
Selectronic Supplies, Inc.	129
Sonar Radio Corp.	120
Sun Parts Distrib. Ltd.	133
Technical Materiel Corp.	82, 83
Teleplex Co.	128
Tele-Vue Towers, Inc.	126
Telrex, Inc.	135
Tennalab	108
Triad Transformer Corp.	88
U.H.F. Resonator Co.	102
U.S. Savings Bonds	127
Valparaiso Technical Inst.	132
Vesto Co., Inc.	122
Vibroplex Co., Inc.	114
Western Distributors	136
Wind Turbine Co.	118
World Radio Labs., Inc.	107
YMCA Trade & Tech. School of N. Y.	129

NEW MULTIPHASE "Q" MULTIPLIER

- Peaks Desired Fone or CW Signal
- Nulls Out Interfering Carrier up to 50 DB.
- No Loss in Speech Intelligibility

- No Insertion Loss — New Two Tube Circuit
- Special High "Q" Pot Core Inductor



MODEL AQ



MODEL DQ



MODEL B SLICER

CONVERTS MODEL A SLICER

Plugs into Model A accessory socket, converting it into a Model B. New front panel and controls provided. Enjoy all the advantages of "Q" Multiplier selectivity on CW, AM & SSB with your present Model A Slicer.

Wired.....\$29.50
Kit.....\$22.50

FOR AM, CW, SSB OPS

Desk Model "Q" Multiplier for use with any receiver having 450 to 500 KC IF. In attractive, compact case with connecting power-IF cable. Power supplied by receiver. Also provides added selectivity and BFO for mobile SSB or CW reception.

Wired.....\$29.50
Kit.....\$22.50

BUILT-IN "Q" MULTIPLIER

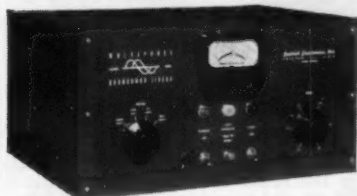
Upper or lower sideband reception of SSB, AM, PM & CW. For use with any receiver having 450-500 KC IF.

Wired.....\$99.50
Kit.....\$69.50

MODEL A SLICER

Same as Model B but less "Q" Multiplier
Wired.....\$74.50
Kit.....\$49.50

A NEW CONCEPT IN LINEARS



MULTIPHASE 600L

BROAD BAND LINEAR AMPLIFIER

NO TUNING CONTROLS!

SINGLE KNOB BANDSWITCHING 10-160 METERS

- Single 813 in Class AB₂. Approx. 2 watts effective or 4 watts peak drive for 500 watts DC input.
- New band-pass couplers provide high linear efficiency: 60-65%.
- Designed for 50-70 ohm coaxial input and output.
- Built-in power supply. Bias and screen regulation. Automatic relay protection.
- Exclusive metering circuit reads grid current,

watts input, RF output, reflected power from mismatched load—switch to any position while on the air!

- Completely shielded — TVI suppressed. Free of parasites! Low intermodulation distortion.
- Choice of grey table model (17 $\frac{1}{8}$ "W, 8 $\frac{3}{4}$ "H, 13"D) or grey or black rack model.

Wired, with tubes.....\$349.50



MODEL 20A

- 20 Watts P.E.P. Output SSB, AM, PM and CW
- Bandswitched 160 — 10 Meters
- Magic Eye Carrier Null and Peak Modulation Indicator

Choice of grey table model, grey or black wrinkle finish rack model.

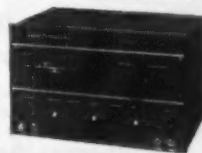
Wired and tested.....\$249.50
Complete kit.....\$199.50

MULTIPHASE EXCITERS

Check These Features

NOW IN BOTH MODELS

- Perfected Voice-Controlled Break-in on SSB, AM, PM.
- Upper or Lower Sideband at the flip of a switch, with 40 DB. suppression.
- New Carrier Level Control. Insert any amount of carrier without disturbing carrier suppression adjustments.
- Talk yourself on frequency.
- Calibrate signal level adjustable from zero to full output.
- New AF Input Jack. For oscillator or phone patch.
- CW Break-in Operation.
- Accessory Power Socket.



MODEL 10B

- 10 Watts P.E.P. Output SSB, AM, PM and CW.
- Multiband Operation using plug-in coils.

Choice of grey table model, grey or black wrinkle finish rack model. With coils for one band.

Wired and tested.....\$179.50
Complete kit.....\$129.50

MULTIPHASE
EQUIPMENT

Central Electronics, Inc.

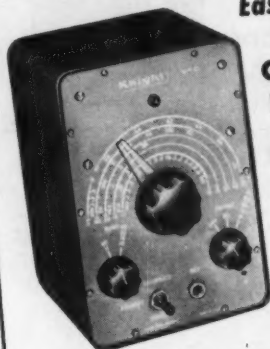
1247 W. Belmont Ave.

Chicago 13, Illinois

WRITE FOR
LITERATURE ON
THE COMPLETE
MULTIPHASE LINE

at **ALLIED**

TOP BUYS IN FAMOUS KNIGHT BUILD-YOUR-OWN KITS



Easy-to-Build

**TOP
QUALITY
KNIGHT
VFO
KIT**
only
\$29⁵⁰

Here's a complete, top quality VFO with built-in power supply. Features careful design and voltage regulation for extremely high stability. Excellent oscillator keying characteristic for fast break-in. TVI suppression through shielding, by-pass capacitors and components layout. Plenty of bandspread; separate scales for 40, 20, 15 and 10 meters (11 and 80 meters have combined scale); smooth vernier drive. Dual-chassis construction keeps heat from frequency determining circuits. Output cable just plugs into crystal socket of your xmitter. Output on 80 and 40 meters. Uses 6BH6 Clapp oscillator, 6BH6 buffer-doubler, 6X4 rectifier, OA2 voltage regulator. Off-Transmit switch for "no swish" tuning. Extra switch contacts for operation of relays or other equipment. Complete with tubes and all parts, gray and blue steel cabinet (only 8½x6x5"), instructions and diagrams. For 110-120 volts, 50-60 cycle AC. Shpg. wt., 8 lbs.

83 S 725. Knight VFO Kit. Only... \$29.50

FREE Send for our lists of Top Buys in Reconditioned Ham Gear

Everyone's trading high with ALLIED these days, and we have on hand outstanding buys in exceptionally fine reconditioned Ham Gear. Ask for our lists of money-saving, top-condition equipment.



**FREE: ALLIED'S LATEST
BARGAIN SUPPLEMENT**

It's packed with big values and new releases in Kits, Hi-Fi systems and components, P. A. Systems, recorders, test instruments, ham gear, parts, tubes and tools. Write for FREE Supplement No. 148 today.



**BUILD YOUR OWN
GEIGER COUNTER**

with this Super-Value Kit

only **\$15⁹⁵**



**SUPER-SENSITIVE
URANIUM LOCATOR
& RADIOACTIVITY
DETECTOR**

the equal of many instruments selling at several times our low, low price

Here's an extremely sensitive instrument for locating uranium and for industrial and lab use—comparable in quality and performance to costly equipment, yet easy to build at only a fraction of the price. It's simple to operate: just turn it on and occasionally flip the high-voltage switch—as radioactive source is approached, clicks in headphone rapidly increase. Uses low-cost long-life batteries. Kit includes all parts, case with handle and leather shoulder strap, 22½ volt and 1½ volt batteries, AEC prospecting booklet, radioactive sample and headphones. Complete instructions, including schematic and pictorial diagrams. Size: 6¼x5¼x2¼". Shpg. wt., 2½ lbs.

83 S 242. Knight Geiger Counter Kit. Only \$15.95
80 S 663. Extra Battery Kit. Only.....\$1.07

ORDER THESE KIT VALUES TODAY!

**ALLIED RADIO CORP., Dept. 15-H-5
100 N. Western Ave., Chicago 80, Ill.**

- ☐ Send FREE Supplement No. 148
- ☐ Send FREE "Reconditioned Ham Gear" Lists
- ☐ Send Kit No. 83 S 725
- ☐ Send Kit No. 83 S 242

\$_____ enclosed.

Name _____

Address _____

City _____ Zone _____ State _____

ALLIED RADIO

not yet...but

SOON

National's great New

NC-300

dream receiver

Combining the most wanted features of thousands of "Dream Receiver" suggestions submitted by hams around the world!

SOON at your favorite distributors you'll see the first receiver in history specifically designed to realize the radio amateur's fondest dreams!

National conducted its great "Dream Receiver" contest month after month, to find out what hams want most. The NC-300 combines the most wanted features from all of the thousands of "Dream Receiver" ideas submitted. You can expect prize-winning performance from the NC-300 because it's a real prize-winner. And you'll get it—because solidly behind this dream receiver stands National's 41-year reputation.

Hams have dreamed of a receiver like this for years. Soon it will be a dream come true. Watch this magazine for the announcement of NC-300 Day—the date distributors everywhere unveil the receiver with the features most hams want, at a price most hams are willing to pay.



IT'S GOT WHAT MOST HAMS WANT... AT A PRICE MOST HAMS ARE WILLING TO PAY:

- longest slide rule dial ever—more than a foot long!
- Band Coverage: 160–1 $\frac{1}{4}$ meters with 10 separate scales including National's exclusive converter provision for 6, 2 and 1 $\frac{1}{4}$ meters.

- No greater sensitivity in any receiver (3–6 db noise figure on all amateur bands.)

- Features greater stability than most receivers costing up to \$695!

- Tuned to tomorrow. Styled to match.

tuned to tomorrow

NATIONAL COMPANY, INC.
61 SHERMAN ST., MALDEN 48, MASS.

National

WATCH FOR NC-300 DAY! To be announced SOON

Final amplifier of the Harvey-Wells
T-90 Bandmaster Transmitter—
using the RCA-6146.



Leading Amateur Designs

...USE RCA TUBES

You are looking at the business end of a Harvey-Wells T-90 Transmitter. In this "final" an RCA-6146 beam power tube delivers the signal punch that gives this transmitter its reputation for ability to "get out."

Here's why RCA high-perveance beam power tubes, like the 6146, are preferred by leading designers of amateur and commercial transmitters.

RCA beam power tubes make it practical to use fewer components, fewer tuning controls—fewer stages. They lend themselves to bandswitching circuits—take full plate input with smaller drivers (a big help in reducing TVI). RCA beam power tubes give you the power you want at lower plate voltages.

RCA High-Perveance Beam Power Tubes are available at your RCA Tube Distributor—for amateur transmitters having input-power ratings up to a "gallon." For technical data on any specific beam power tube type including the 6146, write RCA, Commercial Engineering, Section H37M, Harrison, N. J.



BEAM POWER TUBE RCA-6146

90 watts ICAS input on CW; 67.5
watts on 'phone. Full input to 60 Mc.
Reduced input up to 175 Mc.



RADIO CORPORATION of AMERICA
ELECTRON TUBES
HARRISON, N. J.